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JUNE, 1934

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Editorials and Comments

The Men in the Game

Very little has been said concerning the effect of the new air mail shake-up upon the pilots and mechanics. Very little can be said until the new contractors have operated long enough to furnish figures of employment, wage scales, and maximum hours.

In the pending law (reprinted in this issue) two brief sections involve pilots and mechanics. In one, the Secretary of Commerce is authorized to prescribe the maximum flying hours of pilots on air mail lines, and to approve agreements between the companies and pilots and mechanics for retirement benefits. In the other, a condition upon the awarding, extending, or holding contracts is that the rate of compensation and working conditions for employees shall conform to the decisions of the National Labor Board.

In these provisions we find a positive legal identity awarded employees of the air mail contractors, but the paramount question involved is: "Will the system result in an *increased* employment of pilots and mechanics?"

If the answer may later be found in the affirmative, then the administration has given another definite blow to unemployment. If, however, the change results in decreased payrolls, starvation wages and a curtailment of the general personnel, thereby increasing the now overflowing ranks of unemployed yet highly trained pilots and mechanics, the new regime will have defeated one of the primary aims of the administration—that of putting men back to work in their respective professions.

A few months will give the answer; and in the meantime, the officials both old and new who direct the regulation of mail carriers should set a high standard for increased employment and decent wages.

Bright Index

Oklahoma City's Aviation Club is sponsoring a statewide air tour beginning June 12th; Missouri has scheduled a similar tour for July. Scores of planes will carry many aviation enthusiasts in mass flights over the respective states. We are reminded of the air tours in the "good old days."

These statewide tours will do much to re-create interest in aviation. Primarily established to celebrate and publicize the many new and improved CWA airports, the tours will bring home to the populace the fact that improved facilities for airmen are available and that the necessary groundwork for aeronautical development in their respective communities has been laid.

The motivating powers behind such flight tours not only deserve the acclaim of aviation's population but their whole-hearted support as well.

Your Vote

Several of the states are nearing primary elections. The office-seekers are out in the field, drumming up votes. Campaigns are under way, and, as usual, there is a plethora of material to choose from.

Your vote is as important as any other vote. When solicited, give vent to your ideas and beliefs of necessary or unnecessary legislation, governmental policy and practice toward aeronautics. Perhaps you are particularly informed on some urgent need or expedient change in your city, county or state.

Too often our local and state officials lack a thorough understanding of aviation's problems which are not within the scope of the Department of Commerce. The entire responsibility of instruction rests with those within the industry. It might be well in preparation for future years to let the political representatives of the people know that they too can play an active part to foster and encourage a healthy growth of aeronautics.

Looking Skyward

New Orleans, quaint and historic, modern and bustling, has set the pace and fixed the goal of airdromes in the South and Southwest.

With the magnificent Shushan Airport typifying the foresight of one great Southern metropolis, let every other center of activity in the South and West go its financial limit in thus planning for the future and inevitable traffic in the skies. The Shushan port is a monument to foresight—an ideal made a reality—an idea taken from the air—the ground itself taken from the waters of Lake Pontchartrain.

The air-visitor to New Orleans can see her colorful past in the Vieux Carre—her glamorous present by crossing Canal Street—and her glorious future with an arrival at Shushan, the world's finest Airport. Those of us who now realize that industry is looking skyward may single out New Orleans for a deserved "Well Done!"

The New Lighted Airways

Surveys are completed for lighting the routes between Tulsa and Kansas City, between Tulsa and St. Louis, and between St. Louis and New Orleans. All haste should be dispatched to install and complete these necessary lighted airways.

New Air Mail Route 15, after installation of lights between Waco and Galveston, Texas, will be completely lighted save for the portion of the route between Fort Worth and Amarillo. These two terminus cities and all the intervening points should bend every effort to procure lights for this important sector.

With its decks fifty feet from the water-line, the Armstrong Seadrome will escape the highest waves of the North Atlantic. The 1,500-foot landing surface will permit heavily loaded planes to take off and land with complete safety.

Transatlantica

A glimpse into the future of the Armstrong Seadrome Project

BY STANLEY A. SUYDAM*

DURING THE LAST SIX OR EIGHT MONTHS much has been written in the newspapers and magazines in this country and abroad upon the subject of transoceanic air travel. As Colonel Lindbergh's epochal flight from New York to Paris fired the imagination of the world and did much to stimulate vital interest in aviation and its possibilities, the recent proposal to erect and maintain upon the Atlantic Ocean a series of seadromes has developed an interest in the possibility of safe and regular transportation of passengers and mail by air across the Atlantic. General Balbo's and Colonel Lindbergh's experiences in making flights to and from Europe have definitely eliminated the Northern passage via Newfoundland, Greenland, Iceland, the Faroe Islands and thence to Continental Europe as commercially feasible. Fortuitously Bermuda and the Azores offer the opportunity to fly from the Southern part of the United States to Spain or Portugal but the long over-water flight between Bermuda and the Azores presents so many hazards that even though it were profitable to make such flights, it is very doubtful, to say the least, that regular passenger or mail could be maintained.

The Germans have from time to time stationed the Westfalen between the coast of Brazil and the coast of French West Africa. The practical utility of ships of the tvpe of the Westfalen is extremely doubtful as it is impossible to land a plane upon the decks of the Westfalen and it is necessary, once seaplanes which have landed on the water and have been taken aboard the Westfalen, to catapult them in order that, having been refueled, then may continue their journey. The seadrome project, while of especial interest to the larger cities of our Eastern Seaboard, is also of great interest and importance to the South and Southwest. A glance at the map which is reproduced here will reveal that passengers and mail for Europe coming from, let us say, California, would cross the country via established routes and continue their journey to Europe, leaving Continental United States at Charleston or Norfolk, probably the latter, making their first stop at sea upon the first seadrome which it is proposed to locate 375 miles from New York at approximately the thirty-ninth parallel of latitude. It will be seen that once the seadrome system is installed, air traffic across the United States through the South will increase very greatly as travelers from Europe destined for the Far East would logically fly to Norfolk or Charleston and thence through the South and Southwest to the Pacific Coast seaports.

Recent Developments

A great deal has been written regarding the present status of the Armstrong seadrome project. What has actually transpired during the last six or eight months is that the Seadrome Ocean Dock Corporation applied to the Public Works Administration for a loan of approximately $30,000,000, such money to be used to build and permanently anchor at sea five seadromes. These were to be 1,225 feet long on deck, 300 feet wide at the center section and 150 feet wide at the narrower ends. The Technical Board of Review of the Public Works Administration, after presentation of the project, gave its approval and the committee, consisting of members of the Cabinet, approved the making of the loan, subject, however, to a favorable opinion from the Department of State. Some felt that there might be some international legal impediment and so as a matter of caution the proposal was submitted to the Treaty Division of the State Department. In November, 1933, the Secretary of Commerce, Daniel C. Roper, publicly announced that the Commerce Department had decided to initiate the project by having built a quarter section of one seadrome at a cost of approximately $1,500,000.00. Because it was necessary to have the approval of the State Department, the War Department, and particularly the Navy Department, the Secretary of Commerce suggested that the President appoint a committee to study the seadrome project. This committee was created. The members of the comimttee are:

Secretary of Commerce, chairman; Mr. Eugene L. Vidal, Director of Aeronautics, Commerce Department; Second Assistant Postmaster General Harllee Branch; Admiral Ernest King, Bureau of Aeronautics, Navy Department; Col. J. Carroll Cone, Bureau of Aeronautics, Commerce Department; Lt. H. A. Schade, Navy Department; Mr. Latchford, State Department; Gen. B. D. Foulois, Air Corps; Capt. A. B Cook, Navy Department; Captain Van Keuren, Navy Department; Major Howard, Air Corps; Mr. Rex Martin, Assistant Director of Aeronautics, Commerce Department.

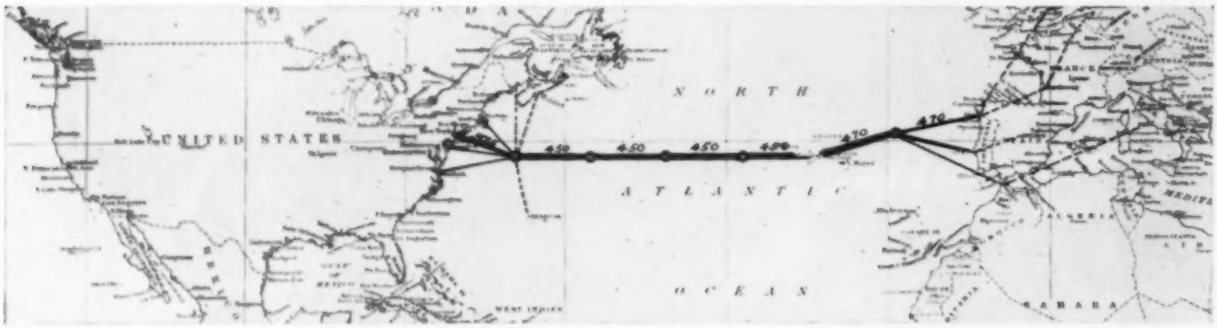
Recently this committee sat in consideration of the seadrome project and the Department of State expressed the opinion that this Government had the unquestioned right to permanently anchor seadromes upon the high seas provided that their purpose was peaceful and provided further that they were not placed and used in such a manner as to interfere with or impede free surface navigation.

The original proposal to build a quarter section of one seadrome, in order to be absolutely certain that it would behave as its projectors are sure that it will, has been abandoned and the plan now is to build one complete seadrome of greater length than originally

*Of Moyle & Suydam, counsel for Seadrome Ocean Dock Corporation.

contemplated. Although it was felt that a landing dock of 1,225 feet in length was sufficient to permit safe landing and takeoff of planes, to make assurance doubly sure it is now proposed to add approximately 300 feet or more to the length of the seadrome. This will permit very heavily loaded planes to take off and land with complete safety.

is no lateral movement of water in wave action and as the supporting columns of the seadrome are streamlined where the project rises through the disturbed surface of the sea, waves pass through the open-work structure exerting no force and releasing no energy. Moreover, the supporting columns are so small relatively that they do not break up wave motion. The



Proposed locations for the five seadromes, equally spaced across the Atlantic. Notice utilization of Azores between fourth and fifth stations.

Stability

The Sun Shipbuilding and Dry Dock Corporation of Chester, Pennsylvania, has built a very large scale model of one-quarter section of a seadrome. This model consists of eight of the proposed 28 supporting columns, with, of course, four decks superimposed. At a recent test of this model, which the writer witnessed at Chester, waves the equivalent of 72 feet in height were produced and, while sea dorries which were exposed to them behaved in characteristic manner, rolling and pitching very heavily, the seadrome remained absolutely stationary, neither rolling nor pitching nor being subject to the impact force of the waves. Incidentally, contrary to the landsman's opinion, the Atlantic never produces waves in the open ocean which exceed a height of over 40 feet. The crest or peak of a 40-foot wave is 20 feet above mean water level and the trough 20 feet below. As it is 50 feet from the waterline to the bottom of the lower deck of the seadrome, a wave less than 100 feet in height (and it is known that none of such height have ever been created in the North Atlantic) would pass through the supporting members of the seadrome without touching its decks.

Test

Landsmen—and, so far as that goes, seamen—do not understand why a floating structure of the type of the seadrome would not respond to wave action. In the first place a seadrome's buoyant elements, unlike that of a ship (its hull), which rests upon the disturbed surface of the sea, are 40 to 50 feet below the disturbed surface and thus avoid the disturbing effect of wave action. A ship must respond to wave action, as otherwise it would founder. The center of gravity of a conventional ship is always above its center of buoyancy and the relationship of center of gravity to center of buoyancy determines the characteristic roll and pitch period of a ship. The center of gravity of the seadrome is well below its center of buoyancy. This effect is produced by the counterbalance ballast tanks, which repose 208 feet below the surface of the sea. As there damping effect of the horizontal flat tops of the ballast and buoyancy tanks effectively checks any tendency that the seadrome might have to rise and fall as the buoyancy of each column is slightly changed by greater or lesser immersion. Moreover, there is a high pressure zone in the trough of a wave and a low pressure zone in the crest and this almost exactly counteracts the effect of greater or lesser immersion.

Anchorage

The method of anchoring a seadrome is ingeniously simple. The anchorage system wil terminate in a large reinforced concrete anchor of a spherical segmental shape, about 100 feet in diameter and weighing approximately 1500 tons. This anchor is provided with a buoyancy compartment which, in effect, makes it a concrete boat. Thus it will have suffcient buoyancy so that it can be towed to the anchorage site and flooded and sunk with its connecting cable and chains. The anchor cable will depend from a buoy which will have all of the characteristics of the seadrome itself. This cable will be about four inches in diameter at the top, tapering to approximately three inches in diameter as it approaches the bottom of the sea. The cable will stop short of the bottom and there will be connected to it two strands of alloy steel chains of non-fouling type. These strands will be 2,500 feet long and they will be attached to the anchor by means of a universal swivel. As neither the seadrome nor its buoy will respond to wave action, no strain will be imparted to the cable system.

The depth of the water at the several proposed anchorages runs from approximately two and one-half to three miles in depth, but the anchorage problem thus presented has been solved to the satisfaction of all who have studied the subject. The use of cable instead of chain and the fact that neither the seadromes nor their buoys will respond to wave action make the problem of anchorage relatively simple.

The seadrome will be connected to the buoy by means of a cable and as a measure of precaution only

the seadrome will be equipped with motors and water propellers capable of relieving any undue strain upon the buoy or anchor cables. These motors and water propellers being located starboard and port at the stern will enable the seadrome to swing itself into the wind in proper position for planes to land.

The details of the anchorage system have been worked out by the engineers of the Wire Rope Division of the John A. Roebling's Sons Company. The Sun Shipbuilding and Dry Dock Corporation is responsible for the design of the supporting members of the seadrome and the superstructure has been designed by the Belmont Iron Works of Philadelphia, Pennsylvania.

Structure

Every detail of the structure and of its equipment has had the attention of experts connected with companies best qualified in the several fields. The design as a whole has been passed by the American Bureau of Shipping and has been classed "*A-1."

Incidentally, the General Electric Company, with the assistance of the Bureau of Standards, has worked out a system of complete aviagation control by means of the radio beacon, radio telephone and telegraph communication equipment for seadromes, land terminals and transport planes. This system will assure accurate directional aviagation and continuous two-way communication with the seadrome or land terminals by the planes operating over the system.

To compensate for the swing of the seadrome around the anchorage system, the goniometer element controlling the direction of the radio beam is connected to a Sperry gyrocompass according to methods worked out by the engineers of the Sperry Gyroscope Company so that the signal beam will always be maintained constant in direction.

Obviously it would be impossible to build a structure such as the seadrome with a draft of 208 feet, as the harbor and coastal waters are too shallow to permit this to be done. In order then to permit the seadrome to be built and towed to sea through the shallow waters through which it must pass, the lower columns which support the ballast tanks are retractable; that is to say, they telescope upward within the buoyancy tanks and the streamlined upper columns. In this position the seadrome draft is 28 feet and, while naturally not as stable under these conditions, there is ample stability to permit it to be towed to sea, where the ballast tanks are permitted to assume their natural position extending 208 feet below the surface. A complete description of all of the characteristics and of the equipment of a seadrome would go beyond our scope here, but full repair, refueling and housing facilities are available on each seadrome and complete meteorological service will be rendered. Quarters for the crew, which will consist of approximately 50 men, are provided and 40 double hotel rooms will be available to overnight passenger guests.

Studies in Costs

Some have said that the cost of erecting five seadromes would be too great to justify their use, but when it is considered that modern first-class transatlantic liners cost approximately $30,000,000 and that their economic lives are much shorter than the life of a seadrome, which is approximately 40 years, it would seem that that argument is effectively answered.

EDWARD R. ARMSTRONG
Inventor and designer of the Seadrome

While it is possible to fly across the Atlantic nonstop, it is impossible to do this as an economical commercial venture. A plane capable of flying 3,000 miles would have to carry such a large fuel supply that it would be possible to carry only a very small pay load, such as perhaps several hundred pounds of mail. With the five seadromes installed at the places indicated on the accompanying map, no flight need be over 450 miles and therefore smaller, faster planes can be utilized and these would be capable of flying a very satisfactory and profitable pay load.

The Seadrome Ocean Dock Corporation believes that it will be possible and profitable for domestic plane operators to transport mail from the United States to Europe via the seadrome system at a rate of 0.2 cents per pound-mile.

On the basis of transportation of mail between terminals 3,500 miles apart, this rate would be the equivalent of $7.00 per pound for air mail transportation, which would be equal to a fee of approximately 20 cents per letter.

It is proposed to permit any company otherwise qualified to utilize the seadrome system and the toll charged will be the same for all. Thus the field for

(Continued on Page 32)

Life Insurance for the Aero Club

BY LARRY J. FISHER*

AFTER THE FIRST FLUSH of enthusiasm for the new flying club dies away, there comes the problem of maintaining interest among the members. This means hard work for the officers, but it is well worth any amount of effort, for upon these labors depends the success or failure of the organization.

If we were to delve into the reasons for the high mortality rate among aviation clubs and pilot organizations we would universally find that the predominant cause for the high death rate lies in a lack of well planned efforts to stimulate interest among the club's personnel. There is due cause for regret that many of the aero clubs are not still in existence, for the furtherance they give to the cause of aviation is a vital one, and it is not improbable to believe that a network of active aviation organizations over the United States although not interrelated or connected in any way, could exert a definite influence regarding national attitudes towards aeronautics.

In the case of the flying club of which I am a member, the membership is restricted to licensed pilots; student pilots are associate members; and although we differ in this respect with most aero clubs, many of our interest maintaining activities during the past years of growth might be applicable to any type of aero club.

Meetings are held twice a month, and the members are reminded by postal cards and by telephone calls on the day of the meeting. No matter how important any affair might be, the human failing to forget the date is generally paramount. Reminders are an efficient and economical method of getting a large turnout.

By Word of Mouth

After the business session of the meeting, we have some form of entertainment. We recently inaugurated the luncheon club plan of appointing a committee to provide the program for the following meeting, and it has met with great success. Previously, the burden was constantly on the shoulders of the officers to dig up the talent for entertainment.

Speakers are always a good feature, *but* keep their time short! Visiting pilots are always invited to the meetings and can usually be persuaded to "say a few words." Variety in subjects and individuality in speakers are the net results. For example, Walter Wedell dropped in one night and gave us many interesting facts about his famous brother, Jimmy. Lt. Ben Scott Custer gave us a word tour into naval pilot training. Frederic Nelson Litten, author of many aviation stories, related some good yarns of the air—and so it goes with the visitors.

Among the "stock" material for brief luncheon talks may be found in your airport superintendent, the Department of Commerce inspectors, and your medical examiners. These men represent experience, and practical facts from their respective professions are always welcome. For example, the doctors can give interesting information on the "whys" of the various physical flight tests.

Keep the speeches short

A surprise rests in the ability of the club's own members to do almost as well as experts. Talks on crop dusting, aerodynamics, radio, engines, airplane structure, navigation, blind flying and airline operations are instructive as well as interesting. Assign each member who is familiar with any particular subject to prepare material for one of these informal lectures. It will be discovered that he will come through with flying colors, and after the precedent is once set, the more reticent members will follow.

Have a blackboard and chalk handy. Illustrated lectures are far more digestible. Engine talks can be made interesting with a cut-away motor, or even some old parts will serve the purpose. If there is a good aviation ground school in town, get the instructors to talk on their particular subejcts. But keep the talks short and space them about one to every third or fourth meeting.

It is well to encourage and fulfill invitations from other organizations for a member of your flying club to talk on some phase of aeronautics. Recently, one

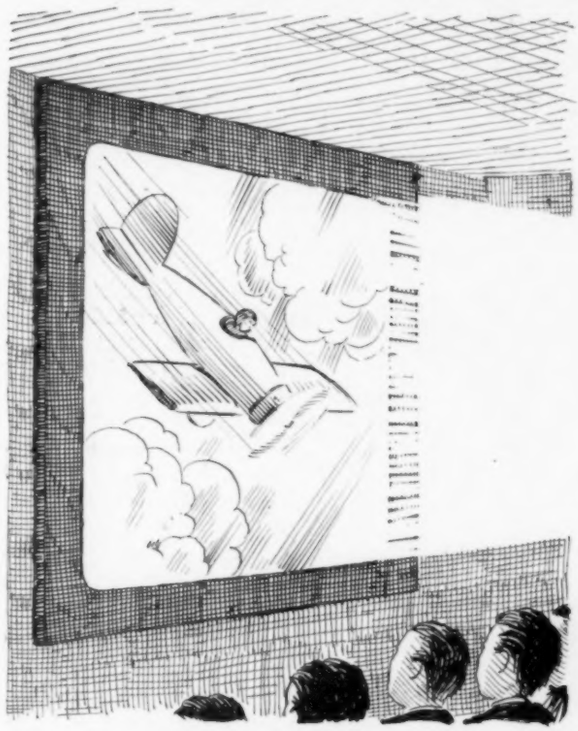
*President, Wing Over Club of Beaumont, Texas.

of our members flew to a near-by town and made an address upon invitation. The lecture was well attended because it concerned aviation, and the appreciation from those that heard the message was unbounded. This visit and talk not only resulted in furthering the cause of aviation, but afforded some good publicity for our flying club.

At other meetings run in a little music—have singers. If some one can teach the group some old flying songs, so much the better. A local lad, as clever as a magician, made one of our most entertaining programs.

Movie Magnetism

One method that never fails to bring 'em out en masse is a movie. The Army Air Corps' information division has a number of especially fine and interesting air films. They are available for the asking—provided no admission fee is charged. The cost involved is only in the transportation from and to Washington. Write W. R. Weaver, Lieutenant Colonel, Air Corps, Chief of Information Division, War Department, Washington, for a list of the films available. They are printed on standard 35 millimeter stock; a projector can be



The movies will bring 'em out

located in any town. American Airlines recently sent us a complete picture with sound equipment, and their local representative was glad to give us a showing.

The most interesting possibility in the film idea is local airport movies. Some of the gang may have an 8- or 16-millimeter camera outfit. If not, practically every drug store or camera shop carry them in stock and will gladly lend one for the occasion. The only necessity to purchase is the film, and it is inexpensive. Catch the gang at the port, "shoot" them in groups, take flying shots, air views of the town, takeoffs and landings, snapshots—an unending wealth of material, and you will not need a scenario writer.

Then watch them turn out at the next meeting to see what kind of Clark Gables they make! The lack of sound equipment need not be a worry for there will be plenty of appropriate sound at the showing of the film.

We have found that when an aviation picture is showing at any of the local theaters, the manager can be talked into having the members of the club as his guests. He will usually be more than glad to come through, especially if he is shown the advantage of the publicity the arrangement affords. Failing this, work for a special admission rate. In either case, attend in a body.

Inside and Out

Social affairs can be combined with the meetings. Buffet suppers following the meetings encourage attendance. And about the time some of the members decide to come just in time for the "eats"—switch the program around and have the supper at the beginning of the meeting. It's a money-back guarantee they will arrive on time for the subsequent meetings.

Throw a party on the slightest excuse. We have "solo" parties, license parties, affairs in honor of newlyweds in the crowd, special parties for visiting pilots and notables of aviation who happen through. Upon completion of our club rooms, the housewarming and subsequent dance proved this form of entertainment as ever enjoyable, and that dances are always in order.

Some of the dances are private; others are open to the public at so much per "open." At the occasional paid dances we tie in with the local dance schools to provide a floor show. At one particular dance we had elaborate aeronautical decorations: Flare chutes on the overhead lights, real and silver cardboard props, doorman in airline ticket taker's uniform, an eight-foot beaver board cutout of a plane for stage back-

Throw a party on the slightest excuse

ground, and the orchestra was placed in an attractive miniature hangar. One of the floor show numbers consisted of nine girls, dressed as "movie pilots." They did formation "flying" to the tune of "Happy Landings." Another well received floor show item was the "Contact, Let's Go!"—a fast tap routine with the girls in mechanics' outfits. There's no end to originality in a well planned dance for entertainment.

Open-air affairs are a part of a varied interest holding campaign. These include barbecues, swims, boat rides, wiener roasts (don't forget the three-point-two!) and plain old-fashioned picnics. Holidays, and the holiday seasons always provide reason enough for festivities.

Civic Interests

Participate in civic affairs and see to it that your club is recognized by other civic organizations. Enter into civic affairs with a will. On the occasion of a parade it is well to make up a float of an airplane. Put an actual prop on it and add sound effects if possible. Keep aviation before the masses at every opportunity by going in for publicity. At fairs and expositions an opportunity presents itself along these lines. Establish a booth in the name of your club; give every member a definite duty to perform in establishing the booth and maintaining the exhibit. Make them feel a certain responsibility in every undertaking.

If there happens to be a regular or reserve Army or Navy Air Corps unit in the vicinity, get the pilots interested in your activity. They are universally fine individuals and will fly over at the slightest hint of entertainment or excitement. Aero clubs are usually guests at the Reserve Officers' lectures.

A monthly bulletin—no matter how small or how limited—is indispensable. If possible, it should be widely broadcast. It will create untold interest among the members, especially if it contains pithy or pointed remarks about the members. It can be cartooned, or otherwise illustrated, and may be printed or mimeographed according to the pocketbook. On the serious side of the bulletin, it should contain a brief resume of important business and announcements taken up during the meetings.

Initiations

Not-too-fancy initiations add color to any club group and should be held twice a year. There are many alternatives on this subject, but we have found it practical and feasible to divide initiations into the formal and purely informal or "mock" initiations. In the former, the officers and veterans should explain the objects of the club, sketch the history, motives, and what the club expects of its members. There might be in this serious vein a pledge administered to the new members. The informal initiation is, of course, an hilarious affair. Here again originality goes unbridled. The ideas of "flight tests" and "blind flying" can be used with no end of the desired results. A social affair should follow up the initiation.

Flying Activity

Airport events, as we all know, keep the member's interest. It is not necessary to go into great detail in this treatment of the subject. The active club usually

Frequent airport events will keep the members' interest

sponsors or supports an annual air meet or contest of some sort. Books have been and can be written on possibilities and suggestions for these activities. In the case of our club, spot landings are the favorite. We co-operate with all the operators on the field, and the contestant may fly any ship on the field for $1.50. The buck goes to the operator, and the fifty cents to the contest fund. The winner of each contest is given a half-hour's free time in any ship he chooses to fly—the contest fund taking care of the expense involved.

Each week's winner has his name engraved on the trophy. The winner of three contests receives full ownership of the trophy, but leaves it in the club room. Try to have some merchant donate the trophy, and have it displayed in a downtown window for the duration of the contest. These spot landings, although they stir up little interest among the general public, will certainly get action from the club members. The half-hour's free time and the reasonable flat charge of $1.50 per contest are the drawing cards.

Finally, it is evident that with a little original thought and lots of work the club will stay alive, and the interest of the members, instead of lagging into inactivity, will grow and prosper into a pulsating, progressive group of flyers, a credit to the town or city in which it holds forth, and a positive force in the great game of aviation. Our club is in its third year—a relatively young organization, but it is constantly growing, although the membership is highly restricted.

It is not the purpose of these suggestions to encourage purely social organizations with aviation far in the background; but without the elements of entertainment, recreation, and well planned activity mixed into the proper proportions with the serious side of the aero club, the club rooms are apt to be deserted,—and the club as well.

The New Air Mail Map

FIGURES, FACTS, AND FANCIES

The User

THERE IS AT LEAST ONE satisfied customer in the audience as the curtain drops on three months of painful readjustment of the Nation's air mail system. He is the patron of the service—the citizen who buys the air mail stamps.

He emerges from the lifting fog and finds service to nineteen additional cities and to four States that had no air mail connections prior to annulment of the contracts. He discovers 28,548 miles of air mail routes as against 25,248 miles under the previous system. He sees four transcontinental routes spread out across the Nation instead of the three of Mr. Brown's vintage. He understands that the cost of the service to the Government has been cut in half; and on July first, he can send a letter for six cents instead of eight, enabling him to send more letters "via Air Mail."

In the South and Southwest the changes evident on the new map cause joy in most cases, grief in a few.

Gain

A new and direct line across the continent is made up of routes 4 and 23, and is a blessing to the South and Southwest with a more direct service to Washington and the East. Actually, it represents a continuation of old route 20—Fort Worth and Dallas to Nashville—the new territory including Knoxville, Tennessee; Bristol, Roanoke, Lynchburg and Charlottesville, Virginia, through to Washington.

New route 24 also includes virgin territory. From Atlanta it takes in Augusta and Columbia and terminates on the Atlantic at Charleston, South Carolina. Old route 33 terminated at Atlanta.

Two long-discontinued routes have resumed in the Southwest, namely, the route between Albuquerque, New Mexico, and El Paso, Texas (now a portion of route 29, which runs up to Denver), and the Fort Worth-to-Amarillo, Texas, route which forms a portion of Texas' fingery route 15.

Loss

The predominant loss to the territory, and the largest of the three bits sliced off the former map, is old route 30 between Kansas City, Missouri, and Denver, Colorado. TWA's old transcontinental route, which split at St. Louis and Amarillo, serving Kansas City and Wichita on the northern swing, Elk City, Oklahoma; Oklahoma City, Tulsa and Springfield on the southern swing, has been shorn of the latter, and hence loud wailings from that quarter. Elk City, however, is the only point now deserted by the suspension. New route 30 gives service to the district, and connects in St. Louis with transcontinental route 2 and at Fort Worth with transcontinental 4. Tulsa has also been given a star route over to Ponca City for nightly connections with route 9.

The daily trip mileage to be flown over the new system is approximately 78,198 miles, as compared with 97,076 miles per day prior to annulment, all of which points to less frequent schedules over some of the routes.

The Bids

Everyone anticipated substantially lower bids; but few were left unstartled when the two May openings took place. Ranging from 8 to 39.5 cents per mile, the low bidders have, in most cases, been awarded the contracts on each of the thirty-two routes.

Outstanding among the rejected bids is the low bid by Kohler Aviation Corporation on the 265-mile route between Detroit and Muskegon, Michigan. "The bidder is disqualified," says the Post Office Department, "for the reason that it has an officer and director in the person of Mr. Richard W. Robbins, one who was an active participant in the 1930 conferences between air mail contractors and Post Office officials which resulted in the contractors, including Mr. Robbins' company, being awarded illegal contracts."

Northwest Airways, Inc., was awarded the contract over route 3 from Fargo, North Dakota, to Seattle, Washington, inasmuch as Northern Air Transport, Inc., the low bidder, was disqualified because of inadequate equipment, illegal bid form, and absence of statement regarding financial responsibility.

Syra Aviation Corporation's low bid of 29.5 cents per mile over the Boston, Massachusetts, to Fort Worth, Texas, route was rejected because the Post Office Department "found it advisable to rearrange the route from Fort Worth to the East in order to provide a more logical, more direct and more serviceable route, making possible a shorter and more direct east-west route through the Southern section of the country to the Pacific Coast, and a more direct and quicker all-air passenger service from the East to Mexico via Brownsville, Texas." At the second opening American Airlines was low bidder at 13 cents on the revised route from Newark to Fort Worth via Philadelphia, Washington and Nashville.

The reorganizations of the several former air mail carrier companies by the creation of new corporations, although not complete in final details, meet the approval of the Attorney General and the Solicitor of the Post Office Department in most cases.

Postmaster General Farley, too, is satisfied with the results of the new deal. "For the first time," he said, "the entire air mail network has been freely open to competitive bidding; although in 1925 the routes of the then rather limited system were let by such bids. In the present letting of contracts healthy and wholesome rivalry has resulted. Independent concerns, not

(Continued on Page 14)

The new Air Mail map, showing designated routes and corresponding numbers. June will see the majority of these routes being flown by the successful bidders. Three thousand, three hundred more route-miles include four additional States and nineteen additional cities.

INDEX TO THE MAP

Routes, New Contractors on Awarded Routes, Low Bidders on Routes Pending Awards, Present Rates, and Former Rates Paid

Route 1, United Airlines, Route from Newark, N. J., to Oakland, Calif. Approximately 2720 miles. Rate of bid 38 cents per mile. Former rate paid 42.65 cents.

Route 2, Transcontinental & Western Air, Inc., Newark, New Jersey to Los Angeles, California. Approximately 2609 miles. Rate of bid 24 cents per mile. Former rate paid 44 cents.

Route 3, Northwest Airways, Inc., Fargo, N. D., to Seattle, Washington. Approximately 1286 miles. Rate of bid 28.8 cents per mile. Former rate paid 45 cents.

Route 4, American Airlines, Inc., Route from Fort Worth, Tex., to Los Angeles, California. Approximately 1328 miles. Rate of bid 39.5 cents per mile. Former rate paid 45 cents.

Route 5, Eastern Air Lines, Inc., Newark, New Jersey, to New Orleans, Louisiana. Approximately 1305 miles. Rate of bid 19 cents per mile. Former rate paid 44.33 cents.

Route 6, Eastern Air Lines, Inc., Route from Newark, New Jersey, to Miami, Florida. Approximately 1195 miles. Rate of bid 29 cents per mile. Former rate paid 44 cents.

Route 7, American Airlines, Inc., Route from Newark, New Jersey, to Chicago, Illinois. Approximately 794 miles. Rate of bid, 39.5 cents per mile. Former rate paid 44 cents.

Route 8, Pacific Seaboard Airlines, Inc. Route from Chicago, Illinois, to New Orleans, Louisiana. Approximately 903 miles. Rate of bid, 17.5 cents per mile. Former rate paid, 45 cents.

Route 9, Braniff Airways, Inc. Route from Chicago, Illinois, to Dallas, Texas, via Kansas City, Missouri. Approximately 955 miles. Rate of bid, 22.5 cents per mile. Former rate paid, 45 cents.

Route 10, Eastern Air Lines, Inc. Route from Chicago, Illinois, to Jacksonville, Florida. Approximately 928 miles. Rate of bid, 19 cents per mile. Former rate paid, 45 cents.

Route 11, United Air Lines, Inc. Route from Seattle, Washington, to San Diego, California. Approximately 1224 miles. Rate of bid, 39.5 cents per mile. Former rate paid, 44 cents.

Route 12, United Air Lines, Inc. Route from Salt Lake City, Utah, to Seattle, Washington. Approximately 1029 miles. Rate of bid, 39.5 cents per mile. Former rate paid, 44.33 cents.

Route 13, General Air Lines, Inc. Route from Salt Lake City, Utah, to San Diego, California. Approximately 778 miles. Rate of bid, 24 cents per mile. Former rate paid, 45 cents.

Route 14, Central Airlines, Inc. Route from Washington, D. C., to Detroit, Michigan. Approximately 457 miles. Rates of bid 23.8 cents per mile. Former rate paid, 44 cents.

Route 15, Long & Harmon, Inc. Route from Amarillo, Texas, to Brownsville, Texas. Approximately 1125 miles. Rate of bid, 19.75 cents per mile. Former rate paid, 45 cents.

Route 16, Hanford's Tri State Airlines, Inc. Route from Chicago, Illinois, to Pembina, N. D. Approximately 772 miles. Rate of bid, 19.6 cents per mile. Former rate paid, 44.33 cents.

Route 17, Wyoming Air Service, Inc. Route from Cheyenne, Wyoming, to Pueblo, Colorado. Approximately 201 miles. Rate of bid, 35 cents per mile. Former rate paid, 44.33 cents.

Route 18, American Airlines, Inc. Route from Boston, Massachusetts, to Newark, New Jersey. Approximately 201 miles. Rate of bid, 33.33 cents per mile. Former rate paid, 44 cents.

Route 19, Alfred Frank. Route from Salt Lake City, Utah, to Great Falls, Montana. Approximately 517 miles. Rate of bid, 39 cents per mile. Former rate paid 45 cents.

Route 20, Low bid by Robertson Airplane Service Company. Route from New Orleans, Louisiana, to Houston, Texas. Approximately 337 miles. Rate of bid, 16.7 cents per mile. Former rate paid, 45 cents.

Route 21, Low bid by American Airlines, Inc. Route from Boston, Massachusetts, to Cleveland, Ohio. Approximately 612 miles. Rate of bid, 24.5 cents per mile. Former rate paid, 43 and 45 cents.

Route 22, Low bid by American Airlines, Inc. Route from Cleveland, Ohio, to Nashville, Tennessee. Approximately 470 miles. Rate of bid, 14⅞ cents per mile. Former rate paid, 43 and 45 cents.

Route 23, Low bid by American Airlines, Inc. Route from Newark, New Jersey to Fort Worth, Texas. Approximately 1460 miles. Rate of bid, 13 cents per mile. Former rate paid, (on old route 20) 43 and 45 cents.

Route 24, Low bid by Delta Air Corporation. Route from Charleston, South Carolina, to Fort Worth, Texas. Approximately 1087 miles. Rate of bid, 24.8 cents per mile. Former rate paid, 43 cents (from Dallas to Atlanta).

Route 25, Low bid by American Airlines, Inc. Route from Washington, D. C., to Chicago, Illinois. Approximately 679 miles. Rate of bid, 29 cents per mile. New route.

Route 26, Low bid by Hanford Tri-State Airlines, Inc. Route from St. Paul and Minneapolis, Minnesota, to Omaha, Nebraska. Approximately 902 miles. Rate of bid, 18.9 cents per mile. New route.

Route 27, Low bid by National Airways, Inc. Route from Boston, Massachusetts, to Burlington, Vermont, and from Boston, Massachusetts, to Bangor, Maine. Approximately 410 miles. Rate of bid, 29.5 cents per mile. New route.

Route 28, Low bid by Wyoming Air Service. Route from Billings, Montana, to Cheyenne, Wyoming. Approximately 405 miles. Rate of bid, 28.5 cents per mile. New route.

Route 29, Low bid by Varney Speed Lines, Inc. Route from Pueblo, Colorado, to El Paso, Texas. Approximately 530 miles. Rate of bid, 24 cents per mile. Former rate paid, 41 cents.

Route 30, Low bid by American Airlines, Inc. Route from Chicago, Illinois, to Fort Worth, Texas, via St. Louis and Tulsa. Approximately 914 miles. Rate of bid, 8 cents per mile. Former rate paid, 41.5 cents.

Route 31, Low bid by Franklin & Baker, Inc. Route from Daytona Beach, Florida, to St. Petersburg, Florida. Approximately 158 miles. Rate of bid, 17 cents per mile. Former rate paid, 43 cents.

Route 32, Low bid by Pennsylvania Airlines, Inc. Route from Detroit, Mechigan, to Milwaukee, Wisconsin. Approximately 265 miles. Rate of bid, 38.9 cents per mile. Former rate paid, 38 and 44 cents.

THE NEW AIR MAIL MAP

(Continued from Page 11)

connected with any of the large aviation interests, have had an equal opportunity to come in and bid."

The Industry

Here, then, are two sides of the air mail triangle: the domestic user of air mail, who finds a better air mail map, and the Post Office Department, that created that map and at the same time, through due process of law and competitive bidding has taken the juicy profits out of hauling the mail pouches in the air. The bacon left on the rind has been widely divided among many of the hungry and hopeful carriers.

The third and final side of the triangle is not so easy to construct. It is the side along which is lined commercial aviation. In addition to the galaxy of new faces, and the surprisingly low bids, we find much doubt as to where the cut-throat road will finally lead. Is the rivalry in the present letting of contracts so healthy and wholesome after all?

It is plainly evident that the long distasteful word *subsidy* as referring to air mail contracts is definitely out. There need be no further painful associations or finger-to-the-lip motions at the mention of the term. The Post Office Department has no intentions of using its funds to foster aviation's profitable development, growth and success. The department's sole concern is for its mail to be transported quickly, safely and economically by responsible carriers.

Prospectus

Consequently it is aviation that must undergo the readjustments necessitated by the new order. The revised map is indeed a progressive step; the facilities for the air mail users are manifold and stimulating to a wide and constant use of the service. But for aviation the recompense has not only been halved, but simultaneously divided up among many, many carriers.

Passenger and express business, then, must fill the widened gap. In several instances the air traveler has been deprived of superior equipment as a result of the low bids. In isolated cases, there have been regrettable discriminations—thoughtless, perhaps—in the lax requirements for equipment, depriving the air traveler on these routes of the erstwhile accommodations. Yet in other cases, the exceptionally fine 1934 equipment will supersede the old, affording the air traveler the finest accommodations humanly possible.

The important point, of course, lies in the fact that the air mail has been returned to commercial aviation —the logical, reasonable and competent medium for handling the job. There is substantial satisfaction in knowing, however, that the contracts are *temporary*, and that the future possibilities of ironing out the many rough spots and inconsistencies of the new setup are especially bright and promising; for, with the Interstate Commerce Commission entering the picture as reflected in the pending and probable air mail law, we see a definite divorcement of the air mail from the pressure of politics. Too, the President's soon-to-be-appointed commission of five will study and survey the entire situation, and no later than February of next year, will present to Congress "its recommendations of a broad policy covering all phases of aviation and the relation of the United States thereto."

Revision of the Air Mail Laws

In this conference report we find the compromise between the House and the Senate which will most likely become the law. Section 15 forbids air mail contractors to hold more than three contracts, and is now the most controversial point in the revision. Sections 20 and 21 bring into being the formation of the all-important commission of five to study and survey all phases of aviation, and to report to Congress its recommendations of a broad policy as requested by the President.

Conference Report

(To accompany S. Bill 3170)

The committee of conference on the disagreeing votes of the two Houses on the amendment of the House to the bill (S. 3170) to revise air-mail laws having met, after full and free conference, have agreed to recommend and do recommend to their respective Houses as follows:

In lieu of the matter proposed to be inserted by the House amendment insert the following:

That the Act of April 29, 1934 (46 Stat. 259, 260; U.S.C., Supp. VII, title 39, secs. 464, 465c, 465d, and 465f) and the sections amended thereby are hereby repealed.

Sec. 2. (a) Effective July 1, 1934, the rate of postage on air mail shall be 6 cents for each ounce or fraction thereof.

(b) When used in this Act—

(1) The term "air mail" means mail of any class prepaid at the rate of postage prescribed in subsection (a) of this section.

(2) The term "person" includes an individual, partnership, association, or corporation.

(3) The term "pilot" includes copilot.

Sec. 3. (a) The Postmaster General is authorized to award contracts for the transportation of air mail by airplane between such points as he may designate, and for initial periods of not exceeding one year, to the lowest responsible bidders tendering sufficient guaranty for faithful performance in accordance with the terms of the advertisement at fixed rates per airplane-mile: Provided, That where the Postmaster General holds that a low bidder is not responsible or qualified under this Act, such bidder shall have the right to appeal to the Comptroller General who shall speedily determine the issue, and his decision shall be final: Provided further, That the base rate of pay which may be bid and accepted in awarding such contracts shall in no case exceed thirty-three and one-third cents per airplane-mile for transporting a mail load not exceeding three hundred pounds. Payment for transportation shall be at the base rate fixed in the contract for the first three hundred pounds of mail or fraction thereof plus one tenth of such base rate for each additional one hundred pounds of mail or fraction thereof, computed at the end of each calendar month on the basis of the average mail load carried per mile over the route during such month, except that in no case shall payment exceed 40 cents per airplane-mile.

(b) No contract or interest therein shall be sold, assigned, or transferred by the person to whom such contract is awarded, to any other person without the approval of the Postmaster General; and upon any such transfer without such approval, the original contract, as well as such transfer, shall at the option of the Postmaster General become null and void.

(c) If, in the opinion of the Postmaster General, the public interest requires it, he may grant an extension of any route, for a distance not in excess of one hundred miles, and only one such extension shall be granted to any one person,

and the rate of pay for such extension shall not be in excess of the contract rate on that route.

(d) The Postmaster General may designate certain routes as primary and secondary routes and shall include at least four transcontinental routes and the eastern and western coastal routes among primary routes. The character of the designation of such routes shall be published in the advertisements for bids, which bids may be asked for in whole or in part of such routes.

(e) If on any route only one bid is received, or if the bids received appear to the Postmaster General to be excessive, he shall either reject them or submit the same to the Interstate Commerce Commission for its direction in the premises before awarded the contract.

(f) The Postmaster General shall not award contracts for air mail routes or extend such routes in excess of an aggregate of twenty-nine thousand miles, and shall not establish schedules for air mail transportation on such routes and extensions in excess of an annual aggregate of forty million airplane-miles.

(g) Authority is hereby conferred upon the Postmaster General to provide and pay for the carriage of mail by air in conformity with the terms of any contract let by him prior to the passage of this Act, or which may be let persuant to a call for competitive bids therefor issued prior to the passage of this Act, and to extend any such contract for an additional period or periods not exceeding nine months in the aggregate at a rate of compensation not exceeding that established by this Act nor that provided for in the original contract: Provided, That no such contract may be extended unless the contractor shall agree in writing to comply with all the provisions of this Act during the extended period of the contract.

Section. 4. The Postmaster General shall cause advertisements of air mail routes to be conspicuously posted at each such post office that is a terminus of the route named in such advertisement, for at least twenty days, and a notice thereof shall be published at least one a week for two consecutive weeks in some daily newspaper of general circulation published in the cities that are the termini for the route before the time of the opening of bids.

Sec. 5. After the bids are opened, the Postmaster General may grant to a successful bidder a period of not more than thirty days from the date of award of the contract to take the steps necessary to qualify for mail services under the terms of this Act: Provided, That, at the time of the award, the successful bidder executes an adequate bond with sufficient surety guaranteeing and assuring that, within such period, said bidder will fully qualify under the Act faithfully to execute and to carry out the terms of the contract: Provided further, That, if there is a failure so to qualify, the amount designated in the bond will be forfeited and paid to the United States of America.

Sec. 6. (a) The Interstate Commerce Commission is hereby empowered and directed, after notice and hearing, to fix and determine by order, as soon as practicable and from time to time, the fair and reasonable rates for compensation for the transportation of air mail by airplane and the service connected therewith over each air mail route, but not in excess of the rates provided for in this Act, prescribing the method or methods by weight or space, or both, or otherwise, for ascertaining such rates of compensation, and to publish the same, which shall continue in force until changed by the said Commission after due notice and hearing.

(b) The Interstate Commerce Commission is hereby directed, at least once in every calendar year from the date of letting of any contract, to review the rates of compensation being paid to the holder of such contract, in order to be assured that no unreasonable profit is resulting or accruing therefrom. In determining what may constitute an unreasonable profit, the said Commission shall take into consideration all forms of gross income derived from the operation of airplanes over the route affected.

(c) Any contract which may hereafter be let or extended pursuant to the provisions of this Act, and which has been satisfactorily performed by the contractor during its initial or extended period, shall thereafter be continued in effect for an indefinite period, subject to any reduction in the rate of payment therefor, and such additional conditions and terms, as the said Commission may prescribe, which shall be consistent with the requirements of this Act; but any contract so continued in effect may be terminated by the said Commission upon sixty days' notice, upon such hearing and notice thereof to interested parties as the Commission may determine to be reasonable; and may also be terminated by the contractor at its option upon sixty days' notice. On the termination of any air mail contract, in accordance with any of the provisions of this Act, the Postmaster General may let a new contract for air mail service over the route affected as authorized in this Act.

(d) All provisions of section 5 of the Act of July 28, 1916 (39 Stat. 412; U.S.C., title 39, secs. 528 to 568, inclusive), relating to the administrative methods and procedure for the adjustment of rates for carriage of mail by railroads shall be applicable to the ascertainment of rates for the transportation of air mail by airplane under this Act so far as consistent with the provisions of this Act. For the purpose of this section the said Commission shall also have the same powers as the Postmaster General is authorized to exercise under section 10 of this Act with respect to the keeping, examination, and auditing of books, records, and accounts of air mail contractors, and it is authorized to employ special agents or examiners to conduct such examination or audit, who shall have power to administer oaths, such examination or audit, who shall have power to administer oaths, examine witnesses, and receive evidence.

(e) In fixing and determining the fair and reasonable rates of compensation for air mail transportation, the Commission shall give consideration to the amount of air mail so carried, the facilities supplied by the carrier, and its revenue and profits from all sources, and from a consideration of these and other material elements, shall fix and establish rates for each route which, in connection with the rates fixed by it for all other routes, shall be designed to keep the aggregate cost of transportation of air mail on and after July 1, 1938, within the limits of the anticipated postal revenues therefrom.

Sec. 7. (a) After December 31, 1934, it shall be unlawful for any person holding an air mail contract to buy, acquire, hold, own, or control, directly or indirectly, any shares of stock or other interest in any other partnership, association, or corporation engaged directly or indirectly in any phase of the aviation industry, whether so engaged through air transportation of passengers, express, or mail, through the holding of an air mail contract, or through the manufacture or sale of airplanes, airplane parts, or other materials or accessories generally used in air transportation, and regardless of whether such buying, acquisition, holding, ownership, or control is done directly, or is accomplished indirectly, through an agent, subsidiary, associate, affiliate, or by other device whatsoever: Provided, That the prohibitions herein contained shall not extend to interests in landing fields, hangars, or other ground facilities necessarily incidental to the performance of the transportation service of such air mail contractor, nor to shares of stock in corporations whose principal business is the maintenance or operation of such landing fields, hangars, or other ground facilities.

(b) After December 31, 1934, it shall be unlawful (1) for any partnership, association or corporation, the principal business of which, in purpose or in fact, is the holding of stock in other corporation, or (2) for any partnership, association, or corporation engaged directly or indirectly in any phase of the aviation industry, as specified in subsection (a) of this section, to buy, acquire, hold, own, or control, directly or indirectly, either as specified in such subsection (a) or otherwise, any shares of stock or other interests in any other partnership, association, or corporation which holds an air mail contract.

(c) No person shall be qualified to enter upon the performance of an air mail contract, or thereafter to hold an air mail contract, if at or after the time specified for the commencement of mail transportation under such contract, such person is (or, if a partnership, association, or corporation, has and retains a member, officer, or director that is) a member, officer, director, or stockholder in any other partnership, association, or corporation, whose principal business, in purpose or in fact, is the holding of stock in other corporations, or which is engaged in any phase of the aviation industry, as specified in subsection (a) of this section.

(d) No person shall be qualified to enter upon the performance of, or thereafter to hold an air mail contract, (1)

if at or after the time specified for the commencement of mail transportation under such contract, such person is (or, if a partnership, association, or corporation, has a member, officer, or director, or an employee performing general managerial duties, that is) an individual who has theretofore entered into any unlawful combination to prevent the making of any bids for carrying the mails: Provided, That whenever required by the Postmaster General the bidder shall submit an affidavit executed by the bidder, or by such of its officers, directors, or general managerial employees as the Postmaster General may designate, sworn to before an officer authorized and empowered to administer oaths, stating in such affidavit that the affiant has not entered nor proposed to enter into any combination to prevent the making of any bid for carrying the mails, nor made any agreement, or given or performed, or promised to give or perform, any consideration whatever to induce any other person to bid or not to bid for any mail contract, or (2) if it pays any officer, director, or regular employee compensation in any form, whether as salary, bonus, commission, or otherwise, at a rate exceeding $17,500 per year for full time.

Sec. 8. Any company alleging to hold a claim against the Government on account of any mail contract that may have heretofore been annulled, may prosecute such claim as it may have against the United States for the cancelation of such contract in the Court of Claims of the United States, provided that such suit be brought within one year from the date of the passage of this Act; and any person not ineligible under the terms of this Act who qualifies under the other requirements of this Act, shall be eligible to contract for carrying air mail, notwithstanding the provisions of section 3950 of the Revised Statutes (Act of June 8, 1872).

Sec. 9. Each person desiring to bid on an air mail contract shall be required to furnish in its bid a list of all the stockholders holding more than 5 per centum of its entire capital stock, and of its directors, and a statement covering the financial set-up, including a list of assets and liabilities; and in the case of a corporation, the original amount paid to such corporation for its stock, and whether paid in cash, and if not paid in cash, a statement for what such stock was issued. Such information and the financial responsibility of such bidder, as well as the bond offered, may be taken into consideration by the Postmaster General in determining the qualifications of the bidder.

Sec. 10. All persons holding air mail contracts shall be required to keep their books, records and accounts under such regulations as may be promulgated by the Postmaster General, and he is hereby authorized to examine and audit the books, records, and accounts of such contractors and to require a full financial report under such regulations as he may prescribe.

Sec. 11. Before the establishment and maintenance of an air mail route the Postmaster General shall notify the Secretary of Commerce, who thereupon shall certify to the Postmaster General the character of equipment to be employed and maintained on each air mail route. In making this determination the Secretary of Commerce, in his specifications furnished to the Postmaster General, shall determine only the speed, load capacity, and safety features and safety devices on airplanes to be used on the route, which said specifications shall be included in the advertisement for bids.

Sec. 12. The Secretary of Commerce is authorized and directed to prescribe the maximum flying hours of pilots on air mail lines, and safe operation methods on such lines, and is further authorized to approve agreement between air mail operating companies and their pilots and mechanics for retirement benefits to such pilots and mechanics. The Secretary of Commerce is authorized to prescribe all necessary regulations to carry out the provisions of this section and section 11 of this Act.

Sec. 13. It shall be a condition upon the awarding or extending and the holding of any air mail contract that the rate of compensation and the working conditions and regulations for all pilots, mechanics, and laborers employed by the holder of such contract shall conform to decisions of the National Labor Board. This section shall not be construed as restricting the right of collective bargaining on the part of any such employees.

Sec. 14. The Federal Radio Commission shall give equal facilities in the allocation of radio frequencies in the aeronautical band to those airplanes carrying mail and/or passengers during the time the contract is in effect.

Sec. 15. After October 1, 1934, no air mail contractor shall hold more than three contracts for carrying air mail, and in case of the contractor of any primary route, no contract for any other primary route shall be awarded to or extended for such contractor. It shall be unlawful for air mail contractors, competing in parallel routes, to merge or to enter into any agreement, express or implied, which may result in common control or ownership.

Sec. 16. The Postmaster General may provide service to Canada within one hundred and fifty miles of the international boundary line, over domestic routes which are now or may hereafter be established and may authorize the carrying of either foreign or domestic mail, or both, to and from any points on such routes and make payment for services over such routes out of the appropriation for the domestic Air Mail Service: Provided, That this section shall not be construed as repealing the authority given by the Act of March 2, 1929 (U.S.C., Supp. VII, title 39, sec. 465a).

Sec. 17. The Postmaster General may cause any contract to be canceled for willful disregard of or willful failure by the contractor to comply with the terms of its contract or the provisions of law herein contained and for any conspiracy or acts designed to defraud the United States with respect to such contracts. This provision is cumulative to other remedies now provided by law.

Section 18. Whoever shall enter into any combination, understanding, agreement, or arrangement to prevent the making of any bid for any contract under this Act, to induce any other person not to bid for any such contract, or to deprive the United States Government in any way of the benefit of full and free competition in the awarding of any such contract, shall, upon conviction thereof be fined not more than $10,000 or imprisoned for not more than five years, or both.

Sec. 19. If any person shall willfully or knowingly violate any provision of this Act his contract, if one shall have been awarded to him, shall be forfeited, and such person shall upon conviction be punished by a fine of not more than $10,000 or be imprisoned for not more than five years.

Sec. 20. The President is hereby authorized to appoint a Commission composed of five members to be appointed by him, not more than three members to be appointed from any one political party, for the purpose of making an immediate study and survey, and to report to Congress not later than February 1, 1935, its recommendations of a broad policy covering all phases of aviation and the relation of the United States thereto. Members appointed who are not already in the service of the United States shall receive compensation of not exceeding the rate of compensation of a Senator or Representative in Congress.

Sec. 21. Such Commission shall organize by electing one of its members as chairman, and it shall appoint a secretary whose salary shall not exceed the rate of $5,000 per annum. Said Commission shall have the power to pay actual expenses of members of the Commission in the performance of their duties, to employ counsel, experts, and clerks, to subpena witnesses, to require the production by witnesses of papers and documents pertaining to such matters as are within the jurisdiction of the Commission, to administer oaths, and to take testimony, and for such purpose there is hereby authorized to be appropriated the sum of $75,000.

And the House agree to the same.

That the Senate recede from its disagreement to the amendment of the House to the title and agree to the same with an amendment as follows:

In lieu of the title proposed to be inserted by the House amendment insert the following: "An act to revise air-mail laws, and to establish a Commission to make a report to the Congress recommending an aviation policy."

And the House agree to the same.

JAS. M. MEAD,	KENNETH MCKELLAR,
D. C. DOBBINS,	HUGO L. BLACK,
M. A. ROMJUE,	CARL HAYDEN,
Managers on the part of the House.	*Managers on the part of the Senate.*

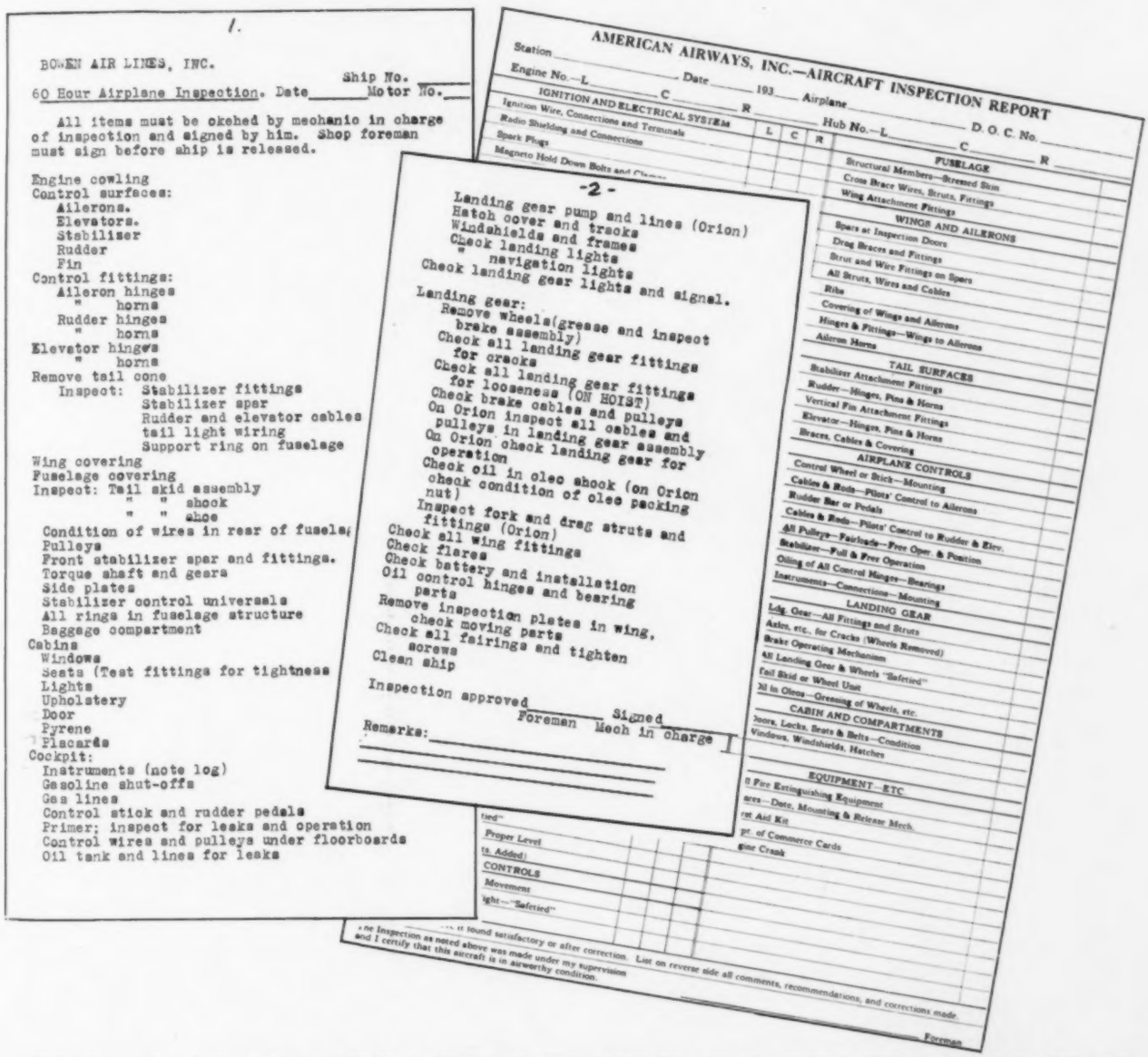
Inspection of Aircraft

By REAGAN C. STUNKEL

PART II: FUSELAGES AND CONTROLS

TO COVER IN DETAIL the various intricacies and designs now in use in fuselages would require volumes. We will, however, divide these innumerable designs into several classes and attempt a comprehensive survey of the approved methods of inspection for these classes. It is as essential as in the engine inspection, that the airplane check be made according to a definite routine, with means of recording the part inspected and the initials of the inspector doing the work.

Herewith illustrated are two representative types of airplane inspection sheets. General practice in aircraft service shops having system sheets of this type, compel the mechanic making the inspection to have the inspection form with him during the time the inspection is being made. Qualifications of the part inspected as airworthy is signified by the insertion of the inspector's initial in the space allotted for the purpose at the side of the itemized sheet. Work necessary to be done to



Detailed inspection sheets are indispensable for a complete and thorough inspection. Here are two forms now in use by transport companies.

the aircraft is noted on the reverse side of the sheet and checked off at the completion of the job by the mechanic doing the work.

Types of Fuselages

Classification covering types of fuselages generally in use now would include: fabric-covered steel tubing; fabric-covered riveted dural structure; metal-covered riveted dural structure; metal monocoque; and wooden monocoque. Various adaptations of these types are common, and not unusual is a combination of two of the types. We will consider each in the order named, giving special attention to the eccentricities that have been noted for each type.

Fabric

Use of fabric as a covering for aircraft is an old and approved method and its use is prevalent in all types of aircraft. In the inspection of an airplane covered in this manner, it is of course wise to have the surface cleaned to facilitate a thorough scrutiny of the condition of the fabric and its finish. Deterioration of a fabric finish is rapid when it is subjected to soaking by oil blown back from the engine and left over long periods without removal. Oil rots the fabric and leaves it in a sodden condition. The inspector should carefully note the condition of the covering where it is drawn tightly over sharp corners, bolt heads or protrusions beneath the cover. Such places are often responsible for a tear or hole in the covering. Storage battery boxes that are improperly drained or leak are often the cause of considerable trouble in fabric-covered airplanes. It is well to note here that the discovery of a wrinkle in a fabric-covered structure warrants the necessity of a particularly thorough inspection of the main structure directly beneath that wrinkle.

The failure of a member in a fuselage is nearly always accompanied by the distortion or tearing of the covering. Zipper fasteners and inspection hole covers that fasten to the fabric usually present some difficulty due to their insecure attachment and should be checked for condition. The cover should be tight and free from cracks in the finish. When the finger is pressed against the surface of the covering and the finish cracks out in circles around the spot, it is a general indication of the need of new covering at that particular spot. Especial attention should be given the corners of the fuselage in structures having square section members. The sharp edge of this type of a member will soon wear through the fabric covering unless it is heavily taped. The interior of the cloth-covered fuselage should be kept clean of the dirt and accumulation that usually collects around the tail assemlby, since the presence of such foreign matter is detrimental to the good condition of the fabric.

Metal

The steel tubing and dural members should be examined for breakage and cracks. There should be no evidence of rust or corrosion in any part of the structure. In riveted dural assemblies, gussets and rivets should be examined for looseness, and the points of attachment of the landing gear and wings inspected. There are in use today few tailskid or wheel assemblies that are trouble free. Due to the terrific abuse that this part of a ship is subjected to, failures of shock units, support members or supporting longerons is not unusual.

It is the inspector's job to check repairs after their completion. In welded structure, he should ascertain that the material used is in accordance with regulations, that the general plan of the repair is in accordance with approved practice, and that the workmanship is standard. In dural structure the heat treatment of the various portions of the job is of major importance and it is the inspector's duty to determine that this treatment is done in accordance with specifications.

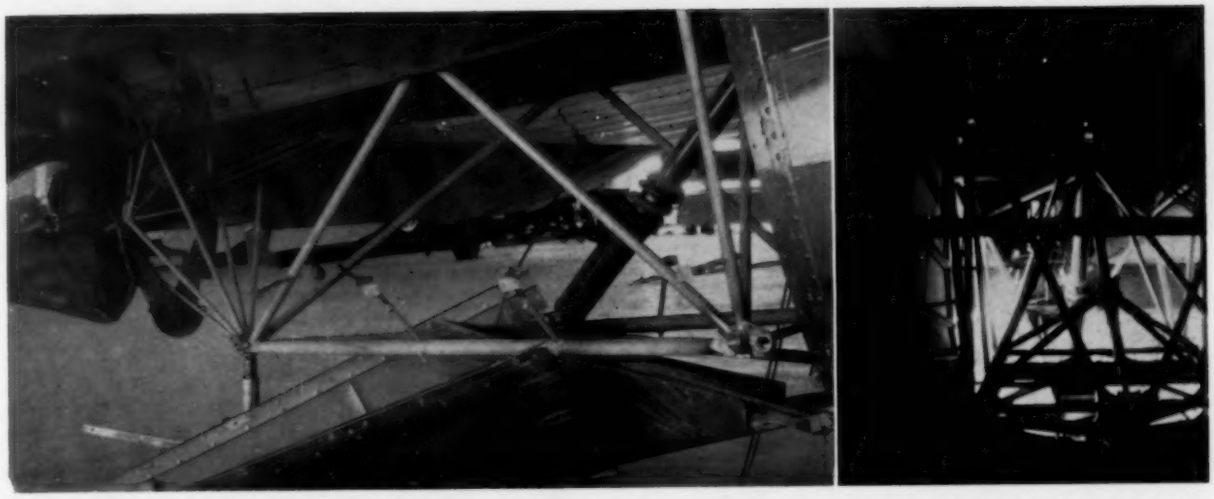
In airplanes utilizing a dural main structure covered with a smooth or corrugated dural skin, inspection for cracked or distorted skin and loose rivets on the outside

A frayed control cable, enlarged three times. Breaks such as this are usually discovered over a pulley.

is recommended. The interior may then be checked for loose or buckled brace and main members, loose gussets, rivets, and corrosion. On airplanes large enough to permit access to the rear of the fuselage, it is usual to make an examination of the control system as far as possible while inspecting the fuselage. Details of control inspection will be given later in this article.

Monocoques

Monocoque and semimonocoque construction has become so popular in the past few years that a knowledge of the peculiar characteristics of these types are of extreme value to the inspector. Wooden construction presents the greatest difficulties, since the outer skin is usually covered with a protective fabric covering and is not easily observed. Forming rings in the interior of the fuselage are often covered with plywood for additional strength, and are therefore not directly available for inspections. Points where landing gear loads, wing loads, and loads developing from the engine mount should be closely examined for evidence of breaking or buckling. Condition of metal tie-rods should be ascertained by feeling the tightening nuts with a wrench. In the wooden monocoque fuselage directly behind the engine, a careful examination of the plywood covering for conditions of oil-soaking is suggested. Oil can do great damage to a wooden structure in a small amount of time. Glue joints, longerons, stringers, floorboards, and all portions of the fuselage



Two views of the rear of Curtiss Condor fuselage, showing details of controls, tail wheel, shock and stabilizer activating mechanism.

available for inspection should be covered in the inspection. Points throughout the structure where a metal fitting is attached to a wooden member should be examined and tested for tightness, since the compressibility of wood often causes such fittings to become very loose. In all parts of the airplane, the wood should be thoroughly varnished or otherwise protected against deterioration.

Metal monocoque construction does not present quite the difficulty to the inspector that he experiences in the wooden type. General principles for examination of metal structures applies in this case, and the inspector should experience no difficulty in apprehending and repairing any failure that may have occurred in this type of aircraft.

Controls

At the completion of the inspection of the basic structure of the fuselage, the inspector is then ready to begin his examination of all the various mechanisms necessary to the operation of the aircraft. There are, of course, a large variety of control systems in use. Operation of these systems vary but little even when the small private airplane is compared to the largest of transports. The transport might have forty pulleys between the control column and the control surface, and the private airplane four, otherwise the systems vary only in small detail. Use of servo controls on the extremely large airplanes of late manufacture have complicated these controls to a small extent, but the principles are still basic. Concentration of all controls at a single comparatively small point leaves a mass of wires, pulleys, levers, pedals and general impedimenta beneath the cabin or cockpit floor of the airplane. Consequently the inspector finds himself becoming very cautious in the beginning of his investigation of the condition of these various mechanisms.

Controls should be inspected, above all else, systematically. Examination of a control wire should begin at one terminal and continue throughout its route to the final terminal. Pulleys, pulley brackets, fairleads, clevises, turnbuckles, balcranks, and terminal fastenings should be given the closest scrutiny possible.

Cables

Pulleys with chipped sides, loose bearings, or badly worn cable grooves should be replaced. Cable that has become frayed can be found by passing the hand over the suspected portion. Broken strands of cable can also be found very successfully by passing a cloth over the surface. Cable that is likely to go for a long period before the next inspection should be examined for evidence of wear on the outside of the strands. A cable that is worn but not frayed can often be twisted in the direction to unwind the strands with the resulting flare-out of several broken strands that were concealed inside the cable. A cable that has been twisted in this manner without the promised broken strands should not be used again. Cables that break (which is rare) usually fail at the very terminus of the last tuck in the splice. Consequently this is a very good place to look for trouble in a cable, particularly brake cables. In the examination of pulleys and cables it is well to ascertain that there is nothing in close proximity to the pulley that can lodge in the groove with consequent failure of the control system. Pulley guides should be in good condition and as close as possible to the cable without actually touching the cable. Only a certain amount of experience can tell an inspector how tight a control cable should be rigged. However, it is well to bear in mind that if the cable is too tight, friction in the pulleys will make the controls very difficult to operate, and impose an additional load on the whole control system. If they are too loose, the resulting lost motion will make the aircraft a very uncomfortable one to fly. Control wires that pass over quadrants at the terminal ends should be safetied in the quadrant with no possibility of the wire jumping out to the groove. Radio bonding should be complete throughout the whole control system.

Tubular Controls

Control systems utilizing tubular controls present fewer difficulties. Loose attachment ends should be tightened with oversize pins or bolts. Supports for control rods that are extraordinarily long must be

(Continued on Page 25)

WASHINGTON

P. T. NORTON, JR.

STATUS OF THE LOW COST PLANE

BRINGING THE AVIATION SITUATION UP TO DATE is not an easy task. It is true that a great many statements of fact can be made, but it is altogether difficult at this time to state the reasons lying behind the bare statements of fact, or to attempt to reach a conclusion based on the facts as found.

Most startling is the complete quietus and shush-shush that envelops the splendid idea of a popular-priced airplane. The impression is gleaned, although no official word is forthcoming, that the popular-priced airplane project is being kept alive at the Commerce Department in the face of great odds. Of first magnitude, is the fact that the $500,000 *allotment* to the Aeronautics Branch of the Department of Commerce for the development of the Poor Man's airplane, which allotment was formally announced by the Public Works Administration, and which in turn was announced by the Department of Commerce Aeronautics Branch with rejoicing, has been subjected (*after* the formal announcement by PWA) to review after review at the instance of the Public Works Administrator, and not one penny of the *allotment* has ever been passed to the Department of Commerce Aeronautics Branch for the development of the popular-priced airplane project. Therefore we do not wonder at the silence of the Aeronautics Branch with regard to the development of the much desired airplane. Since the Aeronautics Branch has not received any of the money reasonably expected by it after the PWA announcement, it can do nothing. And since it can do nothing at present, it wisely refrains from saying anything—since there is still a possibility, though slight probability, that the $500,000 will eventually reach the hands of the Aeronautics Branch.

BUT we must go further into the matter since our interest and the interest of the air-minded Southwest is very great. We must inquire into the reasons lying back of the fact that the funds have never been transferred to the Aeronautics Branch. The Public Works Administration gives as the reason for reviewing the allotment that it desires more complete plans as to how the money is going to be used. Had this reason been advanced *before* the allotment was formally announced, it would have been more credible. Coming as it does now, after this remarkable lapse of time, it seems insufficient to support the fact that the funds have been held up *after* the allotment was announced. There is no further official explanation forthcoming from PWA.

THAT being the case, we must resort to the time-honored Washington sport of getting the low-down. If we cannot find answers to our justifiable questions officially, then we must appease our thirst for logical explanation unofficially. Following this procedure we uncover many motives from the realm of plausible hearsay. First, our old friends the Army, quick to follow the policy of "Ah! take the cash and let the credit go," would quite naturally like to have this juicy half-million-dollar allotment for itself. Second, our old friend the Army has always believed that it alone should have full charge and say-so over anything calculated even indirectly to aid the National Defense. Now put one and two together and we get for Third, our old friend the Army believes that its own equipment should be brought up to date before launching funds to develop an entirely novel idea—and furthermore that from the standpoint of National Defense the wide ownership of private-pilot-owner airplanes would not be worth a continental. While we regret the Army's lack of vision, we cannot help but understand that their attitude is only human—and that in a great conflict of interests, it is "*every man for himself*—and the devil take the hindmost!"

Fourth, is the hearsay that certain great aircraft manufacturing companies are not yet ready to enter volume production methods which would automatically cut the profits made on their products in order to compete with the volume of sales that a first-class $700 airplane would bring about.

SUFFICE it to say that the popular-priced airplane is a project close to the heart of our esteemed Director of Aeronautics, Eugene L. Vidal, and that it is our belief that he will bend his energies toward overcoming the hindrances to the fruition of the idea. The popular-priced airplane idea is not dead, and will not be as long as Mr. Vidal directs the Aeronautics Branch. The idea may take a vicarious rest since Mr. Vidal is not omnipotent, but it will stride forth again at the first opportunity—which opportunity we sincerely hope will come before the *Report* of the Proposed Aeronautics Commission to Determine National Policy in January, 1935. And if not before that time, certainly and most sincerely do we hope that the recommendation for the development of a popular-priced airplane will be among the recommendations of the Advisory Commission on National Policy for Aeronautics. In the meantime, it is *essential* that the in-

terested parties in the South and Southwest, and those elsewhere who envision the advancement of aviation—and the accrual of its pleasures and benefits to the average man, let it be known that they will not countenance this splendid project to be hush-hushed or pressured out of existence.

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Death to S. 2991

IT HAS BEEN LEARNED that the efforts to realize the passage of the Sheppard-McSwain Bill (S. 2991), to encourage civil aeronautics, have been abandoned. The sharp, sure Budget Director's guillotine is said to have done the business. This bill provided for Government assistance to young men between 18 and 25 years who desired to study aviation in a private school of aeronautics, by paying one-fourth of the tuition cost. The Army, of course, opposed it on the ground that it would rather train its own aviators from the start. The Navy was not enthusiastic about it. The Commerce Department approved it. There were other important provisions in the bill which would have aided civil aeronautics materially. But the *old conflict of interests* is again evident, and we must in the end reach the conclusion that the only way to get at anything which will be beneficial to aeronautics as a whole is to appoint a financially disinterested and broad-minded commission to go into the *whole* problem thoroughly and bring forth aeronautics' *community* of interests which assuredly is present.

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The Air Mail Bill

NOW THAT THE SMOKE OF THE BATTLE and confusion raging around the air mail situation is beginning to clear, a mellowing perspective of viewpoint is evident. The issues which were made political capital of by anti-Administration forces as well as the much discussed motives behind the Administration policy are fast being relegated to the background. The debate which took place in the House of Representatives during the *final* consideration of the House Post Office Committee's *final* draft of the so-called Air Mail Bill was characterized by its brevity and the definite conciliatory tone. Everybody had already blown off all the political steam necessary for the Record—and each one was ready to get down to brass tacks—*pass* the bill—*send* it to conference—get some *definite* results. Republicans and Democrats buried the hatchet agreeing that ex-Postmaster General Brown was the root of all Air Mail evil.

THE CONFERENCE REPORT on the so-called Air Mail Bill, we predict, will incorporate the House Bill with its amendments—abandoning the controversial provisions of the Senate bill. The House bill sets up a commission to go into all phases of aeronautics which, after determining all possible salient features, will report to the next Congress the result of its study. Furthermore, the House bill abandons the highly controversial and vindictive provision against allowing former contract holders the right to bid again. It also invites former contract holders to come into the United States Court of Claims to sue. In short, the House bill seemed to be acceptable to House Democrats and Republicans and to the Administration.

THE IMPORTANCE OF THE COMMISSION set up in the Air Mail Bill as it finally becomes law cannot be underestimated. Through this Commission it will be possible for the Nation to get a composite picture of our aeronautic structure and build for the future from this broad perspective. A national policy is imperative. Too long have we suffered from jarring factions, jealousies, and conflicting interests.

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The Southwest's New Lighted Airway

A NEW LIGHTED AIRWAY OF FOREMOST IMPORTANCE will soon be under construction between Galveston, Texas, and Waco, Texas, via Houston, Navasota and Hammond.

Rex Martin, Assistant Director of Aeronautics in Charge of Air Navigation of the Commerce Department, has already called for bids for the construction of this route.

The Hammond Intermediate Landing Field and the Navasota Intermediate Landing Field (Sites No. 16 and No. 10, respectively, both Type D ports) will be ablaze all night every night with complete lighting equipment.

This newest of lighted airways will mean that Galveston and Houston will have access to the Southern Transcontinental Airway and to the North—making juncture with the former through Waco.

The new lighted route is 200 miles long with rotating beacons every 15 miles in addition to the two completely lighted intermediate fields mentioned above at Navasota and Hammond.

Public Works Administration furnished the money. It is submitted that no better or more profitable use could have been found for PWA funds.

We envision and advocate further lighted airways throughout the South and Southwest. Particularly between Houston and New Orleans via Beaumont; and between Laredo, Texas, and St. Louis, Mo., via San Antonio, Austin, intersecting Galveston-Fort Worth route at Hammond, thence Palestine, Tyler, Longview, Marshall, Texarkana and Little Rock, Ark.

The South and Southwest may well look skyward—for there are the greatest possibilities for development and expansion.

As a further addition to the national system of lighted airways, beacon lights have already been ordered turned on between Louisville and Indianapolis, and between Omaha, Nebraska, and Davenport, Iowa.

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Interview With Hugh Duncan Grant

WE OFTEN HEAR the statement that "everybody is talking about the weather, but nobody seems to be doing anything about it." It is true that no one can change the weather, but it is not true that we are helpless as the weather's plaything. Through knowl-

(Continued on page 29)

"Not Too Technical"

WINGS: FUNDAMENTAL PRINCIPLES

BY GEORGE CARROLL

WING SECTIONS OF AIRCRAFT do not function by the same principles that involve the streamlined sections discussed last month. Consequently to waylay any confusion we must consider airfoils, or wings, separately.

In streamlining we noticed that airflow about a section was the same above and below the object, because of the symmetrical shape. The problem dealt with reducing as much drag as possible without altering aerodynamic principles; and by this reduction of drag, various portions of the plane offered less parasitic resistance. The results were greater speeds, and efficiency in load carrying capacity.

In the accompanying figures the peculiar structures of wings are shown in cross section views. We see that structurally they are in no way akin to streamlined sections. And in function, the difference is just as noticeable; for the airfoils produce the lifting power—their designs enable the plane to rise from the ground and maintain flight when forced through the air at sufficient speed. Streamlined sections add nothing to this important function of *lift*.

Drag, building up behind the leading edge of the airfoil, is a necessary element in producing this lift, especially in the case of certain types of wings known as "high lift," or thick wings as shown in Figure 1. And we remember that in streamlining, we were bent upon lessening drag—of the parasitic kind. In the subject at hand we realize that drag—of the necessary kind—is fundamentally important.

Take the case of the thick, high lift wing in Figure 1. The thick leading edge abruptly forces the air apart as it is propelled through the air at a speed which we will set at fifty miles per hour. The resultant flow of air about the section is illustrated in the figure. A reduced pressure area is built up on the upper surface. Air, because of atmospheric pressure, must assume its natural state just as any other fluid, when met with interference of any nature. Consequently the air below, which is partially compressed, must rush into the reduced pressure or partial vacuum area. But the wing separates the two conditions, and the force of the upward rush of the air is exerted against the under side of the wing, thereby producing the necessary lifting power. If it were possible to disregard the force of gravity and suspend a flat plate horizontally in the air, we could, by reducing the pressure on the upper surface, cause a lifting force beneath and force the plate upwards. The creation of this partial vacuum on the top of the plate would bring about *lift* from the underside. And just as long as this condition existed, the plate would continue to rise. The same action takes place in the case of airflow about a wing, and is most evident in the case of the thick, or high lift wing, which is designed and employed for load carrying at relatively low speeds.

Let us consider the wing section illustrated in Figure 2. It is thin and gives a more flattened appearance than the section in Figure 1. Should we force this wing of the same area as the wing in Figure 1 through the air at the same speed we assumed for the thick wing, we note in the figure that the reduced pressure area above the wing and the corresponding force below the wing is considerably less, and not sufficient to give

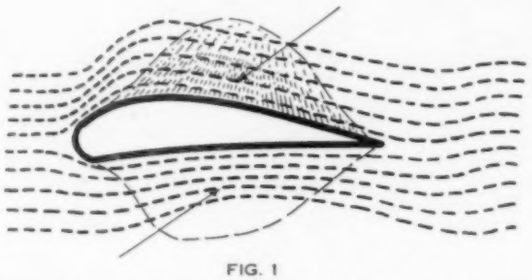

FIG. 1

AIRFLOW ABOUT A HIGH LIFT WING. ARROW ABOVE DESIGNATES REDUCED PRESSURE AREA. ARROW BELOW POINTS TO COMPRESSED AIR.

FIG. 2

AIRFLOW ABOUT THE HIGH SPEED WING. SPEED NOT SUFFICIENT TO PRODUCE NECESSARY LIFT.

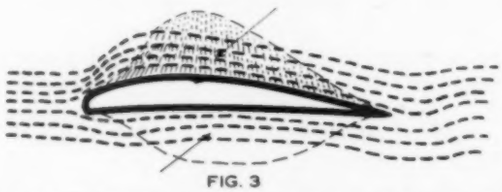

FIG. 3

AIRFLOW ABOUT THE HIGH SPEED WING AT INCREASED SPEED SUFFICIENT TO PRODUCE LIFT. ARROWS DESIGNATE REDUCED PRESSURE AND COMPRESSED AREAS.

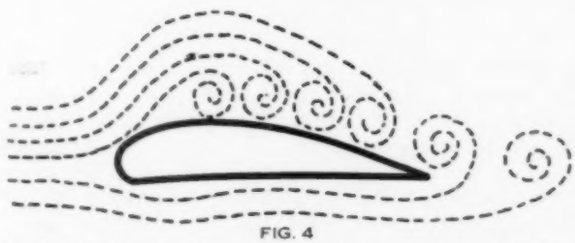

FIG. 4

AIRFLOW ABOUT THE HIGH LIFT WING AT TOO GREAT A SPEED. RESULT: WING FLUTTER.

Partial views of two types of wings. Left: View of Ford Trimotor wing—an example of thick, high lift design. Right: View of Wedell racing wing, illustrating the thin or high speed design.

the necessary lifting power. Because of its design, we must increase its speed.

In Figure 3 we see the results of a substantially increased speed: the drag or reduced pressure area builds up in proportion to the increase, and the necessary lifting power is attained beneath the wing. Thus, with two wings of the same area, but of different design—a thick wing and a thin—speed enters into the problem. At a greater speed the thin wing will lift the same load. With this comparison it is evident that speed ships and racing jobs utilize the more flattened wing, while the slower ships designed for load carrying ability utilize the high lift wing.

Maximum efficiency enters into the problems which should interest us in our study of wings. Figure 4 illustrates what would happen in the event we increased the speed of a thick, high lift, relatively slow wing up to the cruising range of the wing designed for high speeds. The air in this instance is forced apart so abruptly that vortices or whirlpools set in above the upper surface of the wing and destroy the reduced pressure area. In other words, the wing has passed its maximum efficiency point, and the added speed, for which it was not designed, has completely upset the desired condition of airflow about its surfaces. The physical result of this condition upon the airfoils is known as "wing flutter." Serious vibrations occur and the necessary drag is eliminated by the vortices.

It is important not to confuse this condition with stalling positions ("burbling points"), for in the event of wing flutter the speed of the plane can be lessened and the plane itself can be piloted into a glide until the proper speed in lower ranges is reached.

In summary, we note that drag, in the form of a reduced pressure area, is a necessary element in producing lift against the underside of the wing. This drag can be obtained in ships designed for load carrying by means of thickness of design. Or it can be obtained in ships designed for speed by means of a thin or more flattened design. It is evident that the thick wing displaces more cubic feet of air for the same amount of wing area or at the same speed as the thin wing. With the greater amount of air displacement comes a correspondingly greater amount of reduced pressure area on the top surface of the wing and a greater lifting force acting upon the lower surface.

Airfoil designs have been the subject of much research, experiment and change. Wings on the modern types of aircraft admirably reflect these many years of study and refinement. In a broad discussion an understanding of their principles is available for the nontechnical reader, but for deep study and complete acquisition of all the knowledge about wings, one must go to the works and reports of the great designers.

The drawings utilized herewith for illustrative purposes do not represent mere theoretical data; the actual airflow about such bodies have been proven by smoke screen tests, making visible to the eye the action surrounding these sections under varying conditions.

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Aerovias Centrales Inaugurates New Line

Streaking through the skies of Central Mexico, along the shores of the Gulf of California, thence up the Pacific Coast to Los Angeles in record time, the first through airliner of Aerovias Centrales thundered over the heads of the large crowd of welcomers assembled at Grand Central Airport in Los Angeles and touched its wheels to the runway just 7 hours and 57 minutes flying time from Mexico City. Inaugurating the first one-day service between Los Angeles and the Mexican capital, it forged a direct connecting link between the Pacific Coast and the aerial network of the Pan American Airways System through Mexico, Central America, the West Indies and South America. The scheduled run of the plane was delayed at several stations along the route because of the enthusiastic receptions accorded the new service. The inaugural run was hailed widely in the press as an epochal flight and another great milestone in the bettering of relations and understanding between Mexico and the United States.

Aerovias Centrales, an affiliated company of the Pan American Airways System, has, for more than a year, pioneered the development of a connecting service, through Central Mexico, to meet the demands of business interests both in Mexico and in the United States for a dependable, fast connecting air service between the western states and the Pan American Airways System at Mexico City. Using the facilities of Pan American at Mexico City, and assisted by the radio communications and weather reporting systems of the international air transport system, Aerovias Centrales has made splendid progress toward development of a high standard transport service over the routes between Mexico City and El Paso and between Mexico City and stations on the Gulf of California. The new international service, from Los Angeles to Mexico City, has been in the course of development for several months.

NOMENCLATURE

By W. A. Hotmann

FAMILIARITY WITH A COMMONLY USED LANGUAGE and terminology is a prerequisite to any discussion. In aeronautics, the terminology has become more or less highly specialized since 1910, and as in the case of all sciences nomenclature has been superimposed on the purely practical vocabulary that is used by men who fly and maintain aircraft. A possession of this knowledge and a familiarity with aviation nomenclature must be acquired as the first step in the study of aeronautics. Some of the terms used constantly in aviation are oftentimes self-explanatory, yet never simple enough to forego discussion of meaning.

For example, the generic name of *aircraft* is applied to every vehicle capable of being supported by air. When the support is static, the result of buoyancy, as in the case of the balloon, the craft is referred to as *lighter-than-air*. When the support is dynamic, and results from relative motion between the air and a certain part of the structure, the craft is described as *heavier-than-air*. Since balloons and dirigibles still represent a limited field at the present time, and since we are most concerned with heavier-than-air craft, we shall devote our study of terminology to the latter phase.

Types of Aircraft

Heavier-than-air craft may be divided into four classifications: the *ornithopter*, which has wings that flap in imitation of birds; the *helicopter*, which depends for its lift upon the vertical thrust of air propellers; the *glider*, which is an airplane minus the engine; and, finally, the *airplane*, with which we are particularly interested. No measure of success has ever been obtained with the ornithopter or the helicopter, and of course the glider is an airplane without an engine.

The airplane can be divided into the classifications of *landplanes*, *seaplanes*, and *amphibians*. These terms, almost self-explaantory, relate to airplanes rising from and returning to the ground, the water, and to either respectively.

A further division is made in accordance with the number and location of supporting surfaces. A *monoplane* is an airplane having only one wing or supporting surface. A *biplane* has two sets of surfaces, one above the other, and a *triplane* is one having three such surfaces. An airplane with three or more supporting surfaces is referred to as a *multiplane*. A *tandem* is one in which the main supporting surfaces are located one behind the other.

The final division to be made is just as simple, and depends upon the location of the propellers which drive the airplane through the air. A machine with the propellers in front of the plane is a *tractor*. One with the propellers in the rear is a *pusher*. In certain planes of recent design fitted with three engines, there have been one tractor and two pusher propellers; while on the four-engined craft, two pairs or propellers in tandem have been employed, resulting in two propellers in front of the wing and two behind the wing.

Parts of the Airplane

The next natural step is the listing of the principal portions of the airplane's structure, and the manner in which the characteristics of these portions are specified and known generally. The structure of aircraft may be divided into four categories: the *wings*, the body or *fuselage*, the *landing gear*, the *tail surfaces*.

Wings

In defining the term *wing* a difficulty is encountered inasmuch as it has given rise to much difference of opinion. A bird admittedly has two wings; yet a monoplane which more closely follows the bird in arrangement of surfaces is generally considered as having but one wing. After all, we are dealing with aeronautics and not bird study, and the officially approved definitions, which have been changed from time to time, now endows the monoplane as having one wing, the biplane with two—a single wing being considered as extending clear through from tip to tip. When only part of the structure is referred to, the term wing is still applied, but with a distinction established by the addition of another adjective, the upper wing being considered in two sectors; the upper right wing and the upper left wing.

The *wing* cell is the complete wing assembly and bracing members. In a machine with two or more superimposed wings, the cell is divided into *bays*, each bay constituting any portion of the wing between ad-

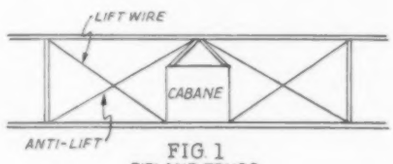

FIG. 1
BIPLANE TRUSS
FRONT VIEW

FIG. 2
BIPLANE TRUSS
PROFILE

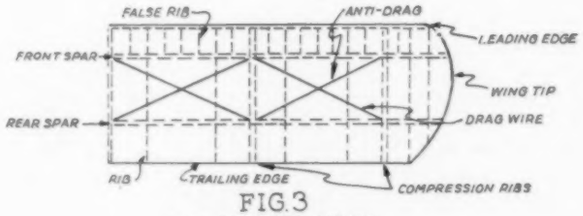

FIG. 3
~~ WING STRUCTURE

jacent struts. Thus a biplane or triplane may be described as single-bay, two-bay, and so one, depending upon the number of bays in the cell on each side of the center line. A *panel* is that part of a wing that is built as a unit. A single panel may extend over one, two or more bays, depending upon the size of the plane. In planes up to 6,000 pounds weight, a single panel almost invariably extends from the tip very nearly to the center line—a short center section being inserted between the right and left panels of the upper wing.

In a wing combination, especially in a biplane and triplane, there are several elements of the bracing systems which receive distinct names. The *interplane struts*, as the name implies, are those members which run vertically between the upper and lower wings.

To complete the arrangement of trussing, the struts are ordinarily supplemented by certain wires. In the common type of truss, every bay has the form of a six-sided solid, and structural stability and rigidity generally prescribe a separate system of bracing in each of the six faces. A pair of diagonal wires are therefore used in each face, so that there are altogether three sets of wires, each including the diagonals in two opposite sides of the bay. The appearance from the front is shown in Figure 1.

The wires running upward and outward are termed *lift*, or *flying wires*, since they carry the load in normal flight. The opposite diagonal wires are the *antilift wires* or *ground wires*. The plan form of a wing is illustrated in Figure 1. Here the *drag* and *antidrag* wires are shown, the former being those which run backward and outward away from the center line of the airplane.

In the side view, Figure 2, the wires which primarily save the trusses from twisting or vibrating are shown; they are referred to as the *stagger wires*.

Figure 3 shows the interplane bracing on the plane of the wing, and displays certain structural parts, the most important of which are named on the illustration. The only other structural element of the wing truss which needs mentioning is shown in Figure 1. A *cabane* is a small pyramid of struts rising from the body or fuselage to support the upper wing. In some cases directed downward to carry the lower one. The same name is applied to an assembly of similar form which supports the *antilift wires* of a monoplane.

NEXT ISSUE: *Nomenclature of Fuselage and Tail Assembly.*

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United Air Lines Leave Southwest

Because its bid on the Chicago-Dallas air mail route was not accepted United Air Lines, veteran Southwestern transport company, withdrew its service from the Kansas City-Dallas division of that route on May 12, eighth anniversary of the company's operations on the Great Lakes-Southwest Airway. United announced it would continue operation of passenger-express service with multi-motored planes between Chicago and Kansas Ctiy.

Most employees on the discontinued line were transferred to other points over United's transcontinental system.

Inspection of Aircraft

(Continued from Page 19)

secure, since the rod in compression might show a tendency to buckle. Control rods in a torsional strain should be examined at their end fittings to assure their secure fastening. Lock nuts on clevis ends should be drawn up tight against the fitting.

Link Chain

Controls that make the use of a link chain passed over a sprocket are used for a wide variety of purposes. Landing light, stabilizer control, and the wheel transfer in dep control ships are common uses of the link chain control. In general this type of control causes little difficulty, if it is kept well lubricated. Sprocket keys and pins, however, should be kept tight to prevent shearing.

Ball Bearing Systems

Since the advent of the ball bearing in the control system, the old difficulty of worn hinges and parts has become a minor consideration. The control stick or the wheel column must have as little slack as possible in its attachment to its support, and the wheel should rotate freely. Rig controls so that the cockpit controls are in the neutral position when the control surfaces are at neutral. Guides holding the chain or cable on the wheel drum should be in the proper position. All bolts, nuts, pins, and other fastenings should be safetied and tight unless otherwise specified. Operate the entire control system from the cockpit and note the movement of the control surfaces. They should travel full distance to both extremes without evidence of hanging or binding. Stabilizer adjusting controls should be operated, and special attention paid to see that the stabilizer travel is complete in both directions. Servo control, flap controls, and all the auxiliary mechanisms should be operated, tested, and minutely inspected for any apparent trouble. It is advisable for the inspector to provide himself with a small pressure oil can, and immediately after checking a part of the ship, lubricate the part if necessary.

Engine controls having been checked under previous routine, it is not necessary to again inspect them. Controls for the lowering of landing lights should be operated and the lights checked for focus. Operate all controls and check the corresponding lights.

Retractable landing gear apparatus is checked under a subsequent inspection, therefore we will not consider it here. Flare operating mechanisms should be plainly marked and in the proper place. Brakes must be operated with the wheel on a jack, if thorough conception of their operation is to be expected. Tacks on parking brakes must be functioning properly, and brake pedals should go down the same amount for equal applications of pressure. Hydraulic brakes are efficient and require less attention. The fluid reservoir for this type brake should be full, and the pressure indicated by the hydraulic pressure gauge proper for each application of the brake lever. Any control not covered here can be inspected by the same methods, and the inspector can check off the control section of his check sheet.

Ports of Call

Austin, Texas

R. H. HEIMAN of Dallas has been a regular visitor to Austin lately. He flys about in his trim Monocoupe.

MUNROE (Deacon) EBNER, local mechanic, called a Major "Captain" last week and the Major refused to pay his hangar storage. Now, any officer above the rank of Corporal is "General" to the Deacon. The Deacon desires to be informed how a pilot, flying above the clouds, can tell the direction and velocity of the wind from the air speed indicator.

IRBY COBB, erstwhile flying instructor, is having a difficult time between flying, boating, and courting a pretty blonde student in the University of Texas to do much boating or flying.

DOC HAILE, who operates the field adjoining the Municipal Airport, has recently finished rebuilding FRANK MEADOWS' OX5 Waco. The completed job reflects the diligent effort and ability of Doc, and both he and Frank are justly proud of the results. Just like all of Doc's re-cover jobs, it sparkles in the sunlight like a new dollar.

The OATMAN brothers, PONCHO, JOHNNY and BUSH, are making up for all the time they spent on the ground last winter. Every day finds them in their OX5 Travelaire, keeping the air hot above the airport.

Bowen Lines have had double duty to perform in handling the passenger traffic between North and South Texas since the departure of American Airlines. Long & Harmon, new contractors on Route 15, have taken over the mail.

The grass planted by the city about the administration building has been prospering under the bright spring sun. Hence it falls the duty of the airport population to make use of the new lawn mower so thoughtfully donated by the city. VIVIAN SPECKLES is gradually gaining efficiency at the job, and expects to be able to do perfect Immelmanns in the corners where the grass is particularly high. So far, however, he has only been able to master stalls.

Beaumont, Texas

Flying interest in Beaumont has increased to the extent that in the past month we have had eight students to solo, some in less than three and a half hours. The solo students are: MISSES LOIS NEEL and IRMA CLARK, "DUD" JACKSON, JOE GREGG, HERBERT PEAVY, L. A. WASSNICH, GLENN CORNWELL and NOLAN PREJEAN, all of Port Arthur.

ROY HEIMAN of the Monocoupe Corporation in Dallas was a visitor in the Wing Over Club of Beaumont this past month. Mr. Heiman has visited the Club on a number of occasions and we are looking forward to another visit from Roy.

A. O. RUSSELL, photographer, and DON BOWYER, pilot, have been in Beaumont for the past month on an air survey, flying a Wasp-powered Flamingo. They are making a tour for the Fairchild Aerial Surveys. Messrs. Russell and Bowyer have been frequent visitors to the Wing Over Club while in Beaumont.

THE WING OVER CLUB held the customary initiation of new members on May 24th. This is always a large event on the Wing Over program, due to the dinner-dance that follows the initiation.

The election of officers of the Wing Over Club will be held on June 7th. On the nominating committee are: B. FRANK EDGAR, FLOYD ADDISON and WILEY SULLIVAN. This committee nominates three candidates for each office and also for the board of directors.

MRS. HELEN R. JOHNSON, Brownsville, Texas, a member of the Wing Over Club, has received her transport license. Mrs. Johnson flies her Fairchild, "Buddy," over quite frequently to attend Wing Over meetings and be with her friends in Beaumont.

JIMMY MATTERN is scheduled to visit the Wing Over Club of Beaumont in the near future. We are looking forward to having Jimmy Mattern to autograph his ship, which is painted on the wall of the club room. B. H. GRIFFIN, co-pilot with Mattern on the flight to Russia, has already autographed the ship.

The club room wall has paintings of fourteen famous ships and almost all of them have been autographed by the pilots who flew them. The walls are painted blue and with white clouds and the ships are painted on them in their original colors. Some of the autographs and ships include JIMMY and MAY HAIZLIP, JIMMY WEDELL, CAPT. LOUIS A. YANCY and JIMMY DOOLITTLE.

The Beaumont Airport had as a visitors L. N. WESTMORELAND, 58 years old, who started flying at the age of 54. Mr. Westmoreland flies a Kinner Eagle, which he has had for the past three years. He flew here from Prescott, Arkansas, his home, to visit a brother in Beaumont. He does all of the mechanical work on his plane, which looks practically new. He is interesting to converse with about his flying as he enjoys it and has made a number of long trips in his plane. He flies alone most of the time.

The pilots and civic organizations of Beaumont have been instrumental in retaining the air mail route from New Orleans to Houston. Within the next thirty days the mail will be flying again on this important Gulf Coast route.

Chanute, Kan.

GLEN MCCONNELL has purchased a Barling NB3 from BOB GAY of Pittsburg, Kansas. He hangars it at Chanute Airport.

JIMMY BAKER has rebuilt a Laird for ALBERT PAYTON, and it will be ready to test hop in a few days.

L. O. ANDERSON and HOWARD BUSH stopped here on their way home from a trip to Mexico City. They were flying a Kinner Eagle. Their home is in Duluth, Minnesota.

O. E. DICKERHOOF has been experimenting with a five-meter radio broadcasting and receiver set in his Warner Cessna. GEORGE OSBURN and JUNIOR MCCLARRY built the set and installed it. They were able to talk back and forth at a distance of over 100 miles,

TWA's new Douglas Luxury Airliner, flying over Kansas City's financial center. The double-towered building at right is one of Kansas City's most recent structures and houses the Union National Bank. Directly beneath wing tip in foreground is the Commerce Building, housing one of the Southwest's largest banking institutions.

which is a record for this part of the country. There is no static in a five-meter set.

The apron that has been under construction is completed now and most of the CWA work is almost ended at the Chanute Airport.

Dallas, Texas

Since the first of April, "Doc" Booth has delivered eight new WACO's to the following: J. M. Rush, Dallas, Continental Cabin; Charles Pettit, Dallas, Wright Cabin; Gay Hammond, Fort Worth, Jacobs Cabin; Carl Everett, Gladewater, Continental Cabin with Ambulance equipment; Strake Petroleum Company, Houston, Wright Cabin; Dr. J. H. Massie, Dallas, Wright Cabin; Homer Snowden, Kilgore, Jacobs Cabin; and Humble Oil & Refining Company, Houston, Wright Cabin.

Long & Harman, successful bidders on route 15, will retain shops and base on Love field for operations. They began carrying mail and passengers June 1st.

The Compania Mexicana Aerofoto, S. A. Fairchild, flown by Cloyd Clevenger, was recently overhauled in the new service department of Hangar 1. In addition to the service department, Doc Booth has installed a complete line of parts and supplies.

Capt. Bottenfield, a veteran in the flying business recently flew into Dallas in his Bellanca. He has been flying twin motored Sikorsky Amphibians based at Rio de Janerio. At the present time he is located in Dallas.

Claud Gossett has opened up a new field near Oak Cliff with a complete flying service. He uses his KR 21 most of the time.

Lou Foote's Hangar "A" has been a busy spot on Love Field. Sales of used equipment have been exceptionally good, and an increase in the number of students in his mechanic's training course. Last month, Foote absorbed the interest of Van Cleave, and is now sole proprietor of the flying service.

Kansas City

J. L. PARKER, general purchasing agent of the Gas Service Company, piloting an airplane entered in the Chamber of Commerce good will tour into Oklahoma, flew five days as the advance escort of two busloads of "trippers." Mr. Parker carried CONRAD H. MANN, president of the chamber, back to Kansas City from Tulsa, then flew back to rejoin the party. He carried different members of the tourist party on the "hops" from town to town.

DR. J. D. BROCK, daily airplane flier whose consecutive record now is far past 1,500, bought a ranch of 2,700 acres in Oregon County, Missouri. The Chamber of Commerce at Westplains used that "local interest" at once to prevail on "Doc" to provide a luncheon speaker. COL. RUBY D. GARRETT, general counsel of the Chamber of Commerce, accepted the invitation from JUDGE WILL H. D. GREEN, president of the Westplains Chamber, and C. H. WOODS, secretary. He spoke on the closer linking of communities made possible by private flying. He was Dr. Brock's passenger both going and coming.

An air tour of Missouri by fliers of all the principal cities, routed to touch at twelve or fifteen new airports developed under recent Federal encouragement, will be scheduled July 16.

LIEUT. HARRY C. WISEHART has taken over the "C. O." duties in connection with the Air Corps Reserve unit at Kansas City, relieving CAPT. WILLIAM B. WRIGHT, JR., who has been assigned to duty elsewhere. Meanwhile Captain Wright has been ill at the Army hospital at Fort Leavenworth. He has recovered and is now on sick leave.

A tentative reorganization of United States Airways as U. S. Air Lines has been worked out, with WINFIELD M. CAMPBELL as president. This new setup will be completed in case the campaign by air mail users and business interests at Kansas City, Denver and in-

termediate points, are successful in prevailing upon the Post Office Department to revive the Denver air mail route, which U. S. Airways operated. Mr. Campbell, who operates a large baking enterprise, has owned an airplane the past four years, traveling in it almost exclusively on his business trips. Associated with him in the effort to revive the Denver line are J. M. DANIELS and LT. DON C. WALBRIDGE, former operations manager for U. S. Airways. The Chambers of Commerce of Kansas City, Missouri, and Kansas City, Kansas; Salina, Kansas, and Denver, Colorado, have been particularly active in pushing this project.

Discontinuance of the United Air Lines service south of Kansas City cut off an employee group of thirty-six well paid individuals in this center alone. Belated efforts of business interests here and elsewhere up and down the Chicago-Kansas City-Dallas route to persuade United to continue service in the hope of gaining the permanent air mail contract, met with no success. The United maintains its operations from Kansas City to Chicago, one schedule daily, and to Omaha, Nebraska.

Oklahoma City, Oklahoma

One of the largest civilian mass flights of planes ever to take place in Oklahoma is scheduled to depart from Oklahoma City on June 12th for a five-day tour of newly improved Oklahoma Airports.

Approximately 40 planes and 100 persons will make the tour. The schedule is:

June 12th, Oklahoma City to Hugo, via Shawnee, Seminole, Coalgate, Atoka, Antlers and Idabel.

June 13th, Hugo to Chickasha, via Durant, Marietta, Ardmore, Sulphur, Walters, and Duncan.

June 14th, Chickasha to Mangum, via Lawton, Frederick, Altus and Hobart.

June 15th, Mangum to Blackwell, via Elk City, Woodward, Enid and Stillwater.

June 16th, Blackwell to Tulsa, via Bartlesville, Miami and Claremore.

The flight is being sponsored by the Aviation Club of Oklahoma City of which Moss Patterson is president. Elaborate entertainment programs are planned for the members of the tour at every stop.

St. Louis, Missouri

The St. Louis Flying Service has just completed moving its equipment and business into its new hangar on Lambert Field, formerly occupied by the American Airways. This hangar is the largest single unit on the field. The company reports an increased business during the last six months. Among its new purchases is a Stinson trimotored airliner, which has a seating capacity of ten passengers and a pilot.

The State Chamber of Commerce's Second Annual Aerocade will be staged during the week of July 16, 1934, according to a decision reached at a luncheon at the Missouri Hotel in Jefferson City recently. Eighteen attended the meeting called for the purpose of discussing the plans for the air tour of the State and it was definitely decided that it would be conducted under the command of MAJOR PHIL A. LOVE, commander of the Air Squadron of Missouri, and with a Stinson belonging to the Shell Petroleum Company as the flagship.

It is expected that there will be thirty or more ships in the fleet, including military planes, as well as privately owned ships. It is hoped to include a dirigible. The plan is for the tour to start from the port at Jefferson City and to include stops at such places as can take care of the fleet and are interested in the program to be offered. The tour primarily is to promote a more definite Missouri air-mindedness, to emphasize the importance of the many new airports either completed or in the course of building throughout the State.

On May 19th the purchase of the Monocoupe Airplane Corporation from the estate of the late Phil DeC. Ball by a group of St. Louisans has been announced. The group is headed by HARRY H. KNIGHT, P. R. BEASLEY and J. D. WOOSTER LAMBERT. The transaction includes both the corporation's plant at Lambert-St. Louis Municipal Airport and the engine factory at Moline, Illinois. The company will be known hereafter as the Lambert Aircraft Corporation. Beasley will be president of the corporation, Knight will be vice president and THOMAS TOULE will be secretary and treasurer. The new owners plan to continue the manufacture of a new, improved type Monocoupe, and to specialize in the privately-owned plane market, rather than in the transport filed. During his visit to St. Louis last week, COL. CHARLES A. LINDBERGH made an inspection of the plant and its products. Knight and Lambert were among the original backers of Colonel Lindbergh. Purchase of the Monocoupe Corporation marks Lambert's first venture into the airplane manufacturing business.

In commenting on the purchase, Knight said: "We believe that there will be a growing demand for small privately-owned planes in the future. We have just received an order for fifteen planes from the United States Department of Commerce to be used by their inspectors, and we have increased the number of persons employed at the plant from ten to 150."

Work of lighting the airway between St. Louis and Tulsa, and between St. Louis and New Orleans will start immediately, according to the announcement of E. Y. MITCHELL, Assistant Secretary of Commerce. As soon as this work is completed, night air mail service will be given over these routes.

Topeka, Kansas

W. G. WOOD, manager of the Topeka Flying Service, with M. J. CLARK, JR., instructor, reports four new students enrolled for aviation training, two of whom are for private licenses. MISS DOROTHY LAMON, also recently enrolled, is their first "lady" student. This brings the grand total enrollment to 27.

The runways under construction on the Topeka Airport, a CWA project, will be completed in about a month, and the administration building is showing some nice progress. When completed, Topeka will have an airport that will be second to none in the State. The plans call for a nice large swimming pool in front of the administration building. This should be a good "crowd getter" for airport activities.

The Topeka Flying Service, Aeronca airplane dealers, report the sale of an Aeronca C-3 Collegian to DALE FARRAR. of Burlingame, Kansas, delivery being made last week.

ROBERT HORSEFIELD, the flying grocer, has sold his Lambert Monocoupe to LAUREN FREEMAN, secretary-

treasurer of the Propeller Club, Kansas City, Missouri. He is contemplating the purchase of another airplane and likes the looks of the Great Lakes.

WILLIAM E. CALDERWOOD, flying DR. SHILDER'S Stinson, made a barnstorming trip to Manhattan Sunday and reports a good business.

DEE DOUGHERTY, one of the Topeka pilots, has purchased half interest in FRANK JORDAN'S combination wing Eagle Rock. They are overhauling the OX and, according to Dee, we understand the Eagle Rock is going to have pursuit performance. We hope he is right.

Nearly 1,000 miles as the crow flies, from Latrobe, Pennsylvania, to Topeka, Kansas, across Ohio, Indiana, Illinois and Missouri, in an Aeronca monoplane. Another job finished. LOUIS STRICKLER, 19, who has flown since he was 14 years old, alighted at Topeka airport today at the end of the ride and delivered the plane to W. G. WOOD, manager of the Topeka Flying Service. Louis has possessed a pilot's license since he was 16, has broken several junior altitude records, one of which took him above the 15,000-foot mark, is a veteran air circus performer and has a total of 1,200 flying hours. Strickler is visiting M. J. CLARK, 900 Kellam Avenue, instructor at the port.

Tulsa, Okla.

With the Oil Exposition in full progress, a heavy air traffic has ensued, due to the great number of private ships coming in and out of the airport.

With the departure of the United Airlines, the following personnel have been transferred: H. D. ROBERTSON and JACK NORTH to Cheyenne, HERMAN ATKINS to Newark, and GEORGE ———— to Kylertown, Pennsylvania.

BILL PARKER'S 1912 pusher has been flying for exhibition. Its pioneer construction is stirring up much interest among the spectators.

Braniff Airlines started in the latter part of May to carry passengers through Tulsa on an alternate route with their air mail contract. Traffic is definitely increasing.

Waco, Texas

CWA work has been resumed, and the day markers and boundary lights at Rich Field are being rushed to completion.

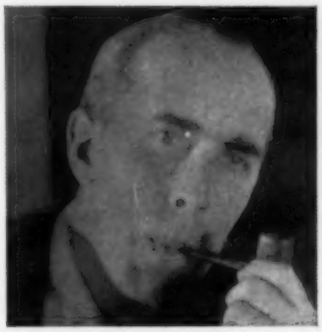
JOHN BARNES, who returned recently with JACK NEWLAND from Wayne, Michigan, with the new Stinson Reliant, has been flying extensively, and is well pleased with the purchase.

Two more students, HARRY HEPPEL and GUY MCNAMARA, have earned their wings under DICK YOUNG'S tutelage. Dick's pusher, which was purchased from BUD EMERSON in Fort Worth, continues to train the students of the new school, which is gaining momentum each month.

Visitors to Rich Field during the past few weeks were: H. D. BUSH of Duluth, Minnesota; MR. LUCKNEY of Dallas Aviation School; F. R. HAILE of Dallas; BURRELL TIBBS of Oklahoma City; W. C. JAMOUNEAU, demostrator for Taylor Cub Aircraft Company; MR. R. L. BOWEN of Texas-Louisiana Power & Light; HAL HENNING, with The Texas Company; MERREL BROCK of Dallas; MR. PIEK of Temple; LIEUTEANT EDGAR of Fort Crockett, and ED VINCELL of Malakoff, Texas.

From Washington

(Continued from Page 21)



HUGH DUNCAN GRANT

edge of the "causes of weather" it is possible for us to change and suit our own actions to its vagaries, and for all practical purposes it amounts to our "conquest of the weather."

Thus, in substance, spoke Hugh Duncan Grant, F. R. G. S., F. R. A. S., F. R. Met. S., famed war superintendent of the British Navy's Meteorological Department, in a highly interesting interview at the Mayflower in Washington.

The principal topics of conversation involved weather and aeronautics. He spoke in glowing terms of the possibilities of the Southwestern United States for unlimited aeronautical expansion. He expressed the hope that he could give its almost incomparable aviation weather his intimate study in the not far distant future. He planned to depart on the morrow to continue his tour around the world while studying international aeronautical possibilities and the meteorology of different sections of the globe. He expressed high regard for the ability of America's Gregg, Chief of the U. S. Weather Bureau, in the field of meteorology, and pointed out the vast field now open to students of meteorology.

In his fascinating easy flowing Celtic-Scotch-English manner, he gave a brief survey of mighty historical units which have had their inception in some whimsical vagary of the weather. Notable was a story dealing with the conspicuous and serious role of the weather in historic World War naval raids, particularly on Zeebrugge and Ostend, a battle story unique in its dramatic unity of action, place and time.

He relates in the layman's language how air resistance, friction and centrifugal force in flight are overcome, comparing air conditions in the lower atmosphere with conditions at the greatest heights so far explored above the earth's surface.

In discussing "Elements versus the Aviator," he pointed out what weather science can mean to aviation: the groundwork for attaining further speed and safety in the air. Answering the question: "Is weather control possible?" Captain Grant inclines to "No." "But can the meteorologist *increase* the number of hours when the aerial ways can be utilized, and *diminish* the hours they should not be used because of weather hazards?" Captain Grant answers, "Emphatically yes!" And with this research is the present day meteorologist bending every effort towards the conquest of the weather.

NEWS BRIEFS

THE INDUSTRY AT LARGE

The new Stinson Airliner on its first test hop.

Stinson

On May 19th, Stinson Aircraft Corporation announced that the new Model "A" Tri-Motored Airliner was undergoing preliminary test flights. Final testing was scheduled to take place within a few weeks.

The Model "A" is exceeding the cruising speed of 150 miles per hour which had been set as a minimum. Take-off and climb characteristics are also better than shown by calculations originally made.

Mr. B. D. DeWeese, President of the company stated: "The combination of gull-wing, braced-wing construction with a wide fuselage is as fast, if not faster than deep center sections so prevalent in current designs." "We hewed closely to the line as regards proven structural designs and avoided construction which would require more than the usual careful testing. The sesqui-spar cantilever wing is now only in the sense of our having improved on previous attempts to build better wings. We can therefore begin production of these planes in quantities as soon as final approval is secured without the drawn-out proving so necessary (on airplanes) with new and untried designs as our tri-motors, built to practically the same general design as regards method of fabrication, have flown tens of millions of miles on the Airlines."

"This Airliner should operate at a lower cost per mile than is now considered good as the Pilot and Operator view-point has been kept in the forefront throughout without neglecting the Passenger who pays the fares."

Kinner

The new Kinner Sportwing, manufactured by the Kinner Airplane & Motor Corporation at Glendale, California, which received its A. T. C. in April, is enjoying substantially increasing sales among private owners. Five orders for this model have already been received by Kinner, which also has on order five Playboys for the Department of Commerce.

Mr. Glover S. Jones, President of the Southern Academy of Aeronautics at Corpus Christi, Texas, has recently visited the factory and taken delivery of a Kinner Sportster.

Hangar Six, Inc., of Winburn Field, San Antonio, recently appointed dealer for Southwestern Texas has taken delivery of one of the new Kinner Sportsters.

Waco

Hugh R. Perry, Sales Manager for Waco Aircraft Company of Troy, Ohio, who has just returned to the factory from a visit to the Southwestern territory, reported one of the best business seasons of recent years, and with the production of the new WACO models in full swing, 1934 will undoubtedly be the best year since 1929.

Lockheed

An executive model Electra has been ordered by the Phillips Petroleum Company, Bartlesville, Okla., for the personal use of Frank Phillips. The order specifies an executive cabin finished according to an Indian motif. Navigation aids will include a Wesport beam and weather report receiver and a Western Electric two-way communication equipment.

Orders for the new Electra have called for a production schedule of three Electras per month. The Lockheed factory has 400 employees on its payroll, and has under construction a new building which will add 10,000 square feet of floor space to its plant facilities.

Domestic orders make up the larger part of the schedule. Two of the eight Electras under order by Northwest Airways will be delivered in July. The next six will be delivered to Aerovias Centrales, affiliate of Pan American Airways.

Anthony H. G. Fokker's distributing organization in Amsterdam, Holland, has ordered seven of the Electras, which will be put in service over European Airlines.

Douglas

Foreign demand is responsible for more than half of the current production of the Northrop Corporation. Out of 17 all-metal monoplanes scheduled for delivery during April and May, 10 were produced for the export market.

Six Cyclone-powered Gammas were exported during April and seven additional Northrops were shipped to foreign countries during May. Four Deltas and Gammas were scheduled for completion during May to fill domestic orders.

DIRECTORY AND CLASSIFIED ADVERTISING

Classified Rates: Five cents per word; minimum $1.00

Directory Rates: $5.00 per inch

FOR SALE

YES SIR!
You Now Can
Solder Aluminum

You can now solder ALUMINUM with a Soldering Iron! And you can do a perfect job! Order your Handy Shop Can TODAY!

HANDY SHOP CAN, Only 25c
One-Pound Spools, Each $3.00

SUPPLY DIVISION, INC. Robertson, Mo.

Here is your chance to get that good-looking blue and silver four passenger airplane, mechanically perfect: Will accept late model car and $1250 cash and teach you to fly. LOU FOOTE'S HANGAR, Love Field, Dallas, Texas.

Licensed Challenger Robin in good condition. Good pigmented dope covering—red with silver trimming. 45 hours since top overhaul. Steel pro., brakes. $800. Come and get it. Jack V. Newland, 900 S. 8th St., Waco, Texas.

Complete supplies and parts. Service and repair. Hangar 5, Love Field, Dallas, Texas.

Parts: 125 gallon gasoline tank with dump valve and 40 feet hose; 1 American Eagle fuselage and empenage; swallow wing, left lower; upper left Travelair wing; right lower and upper American Eagle wing. Box 439, Southwestern Aviation.

Complete right Aeronca wing, licensed. Lycoming, Wasp, J-5 parts and one Aeronca C-3. Write for information about our reasonable flying courses. RITCHY FLYING SERVICE, Meacham Field, Fort Worth, Texas.

WANTED

WANTED—I still want to lease or rent a good plane to take some time in. Party absolutely responsible. Want enough time to renew transport license. If I like the ship, I will consider buying it. Send all information in first letter. Box 1276, Southwest Aviation.

WANTED good used Wasp, J-5, J-6, Warner and Kinner. Must be in good shape. Box 1272, Southwestern Aviation.

Wanted—Fledging and Challenger Commandaire, also floats for same. State condition of equipment and your lowest price in first letter.

Wanted—Good flares, state condition and price, Box 1285, Southwestern Aviation.

SWAP COLUMN

Will trade Aeronca with 150 hours for Waco F or Fleet. Box 1273, Southwestern Aviation.

Will trade a 1933 Ford V8 Coach for good licensed plane. Car like new and in perfect condition. Joplin Air Service, Joplin, Mo.

POSITIONS WANTED

Position as Airport Manager desired by experienced man. Will go anywhere. Salary and references discussed on first communication. Fred Napoleone, Sante Fe, New Mexico.

Transatlantica

(Continued from page 7)

flying will be greatly broadened and successful commercial operation of planes across the Atlantic made possible for all. Nothing in the nature of a monopoly will be tolerated and the various charges for landing and for service will be kept as low as possible in order to stimulate transatlantic flying.

An interesting sidelight is that eastbound transatlantic mail of United States origin for destinations served by the proposed seadrome airway averages 4,000,000 pounds per annum for letters and 36,000,000 pounds for prints and parcel post. Canadian and European transatlantic mails average about 60 per cent of that of the United States, bringing the total transatlantic mail yearly to average 6,500,000 pounds for letters and 58,000,000 pounds for prints and parcel post. By far the greater proportion of transatlantic mail of United States origin is now carried in foreign bottoms and so the transportation of mail by air across the Atlantic via the seadrome route would *not* have a deleterious effect upon American shipping.

It is estimated that passenger fare would be $350.00 or less, and of this sum $70.00 would represent seadrome toll. This is based upon a charge of $0.02 per passenger mile.

The position of the seadrome stationed immediately off the coast of the United States would make it possible to fly from Boston to Bermuda or from New York to any other Northern coastal city. It is anticipated that traffic to Bermuda would be reasonably heavy. Moreover, it is believed that a great many travelers from abroad whose destinations, let us say, were in Central and South America, would travel by air across the seadrome route and thus domestic airlines would be further benefited. As it is now it is perhaps more logical for travelers from Europe and destined for South America to go directly there by boat.

Two Men

Mr. Eugene Vidal, Director of Civil Aeronautics of the Department of Commerce, with whom we, as counsel for the Seadrome Ocean Dock Corporation, first discussed this project, should be given full credit for the satisfactory progress of negotiations with the various agencies of the Federal Government. As is well known, Mr. Vidal is a man of experience in aviation and above all a man of broad vision. It is men of his type who have done much and will continue to enhance development of aircraft and airways.

Mr. Edward R. Armstrong, who is the inventor and designer of the seadrome, is a brilliant and highly successful engineer. He is a civil, mechanical and electrical engineer and is a member of the American Society of Civil Engineers; American Institute of Electric Engineering, and American Society of Mechanical Engineers. For some years he served the DuPont interests as a research and experimental engineer and left the DuPont service when the seadrome had reached the point where it required all of his time. He is mild and completely unassuming but beneath his quiet exterior there is a will and determination without which, we are sure, it would have been impossible to overcome the many difficulties which are inherent in a project of the magnitude of the seadrome. We think that it is fair to say that if the seadrome system is installed it will equal in importance such magnificent human creations as the Panama Canal or as the airplane itself. Certainly without the factor of safety which the seadrome system will afford, regular commercial airplane service between the United States and the countries of Europe is extremely remote.

It is estimated that when the word to build has been given, about two years is all that will be required to completely construct and install the entire system.

Southwestern Aviation Mourns Loss of

MARLIN S. McGRADY

As this issues goes to press, we are staggered by news of the death of Marlin S. McGrady, member of the 52nd School Squadron at Randolph Field and Associate Editor of Southwestern Aviation.

He was killed in a plane crash seven miles north of Cameron, Texas, on May 30th. After visiting his mother in Palestine, Texas, during a two weeks' furlough from active duty, McGrady was returning to Randolph Field with Byron K. Newcomb, who had just been released from air mail duty. The plane apparently developed motor trouble; instead of bailing out, the two pilots attempted a forced landing. The plane crashed from a low altitude and immediately caught fire. Both pilots were burned to death before aid could reach them.

McGrady will ever be remembered as one of the finest characters at Randolph. Beloved by all who knew him, Mac's passing is a heavy loss. He was a thorough pilot, a finished mechanic, a good soldier and above all a true and constant friend. He was one of those rare personalities, who, when the going was tough for the new men, would lend a hand and give encouragement when encouragement was needed.

He was to have been discharged from active duty on July 18th and had planned to devote his full time as Editor of Military Aviation for Southwestern Aviation. The loss is irreparable—his passing is mourned.

Sailing Along

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